THE

AMERICAN REVIEW OF TUBERCULOSIS

ABSTRACTS

VOLUME LV MAY, 1947 ABST. No. 5

Controversial Points in Antituberculosis Work.—Some controversial issues of basic importance are presented and briefly discussed. One is the proper use and dosage of tuberculin in mass surveys and diagnosis. Another is the question whether or not children with tubercle bacilli in gastric lavage, following treatment, may be permitted to attend school. Whether and where BCG vaccination should be used is still *sub judice*. It is pointed out that observations on more than 15,000 student nurses indicate that the first few years following tuberculin conversion are the most critical ones for the development of clinical tuberculosis (a conclusion which most Scandinavian authors reached years ago). This question can be answered for the U. S. only by the proper use of tuberculin tests and by serial examinations over many years.—*Controversial Issues in Tuberculosis Control (Editorial), H. E. Hilleboe, Pub. Health Rep., November 1, 1946, 61: 1561.*—(*M. Pinner*)

Tuberculosis Association Programs.—Since morbidity and mortality from tuberculosis have sharply diminished in recent years and the income of the National Tuberculosis Association from Christmas seals has increased, Dublin urges that the program of the Association be broadened to include other public health activities while at the same time intensifying and perfecting its endeavors for the eradication of tuberculosis.—*The Trend of Tuberculosis Association Programs, L. I. Dublin, Am. J. Pub. Health, October, 1946, 36: 1105.*—(*M. B. Lurie*)

Principles of Tuberculosis Control in Minneapolis.—The principles of the antituberculosis work in Minneapolis, which have been in use for the last twenty-six years, are described and discussed in some detail. The main factors were methodical tuberculin and X-ray surveys, isolation of contagious cases, and prompt treatment of patients with active disease. During these twenty-six years, tuberculosis has rapidly declined in Minneapolis, as shown by a decrease of the mortality rate from 120 in 1920 to 27.1 in 1945, a decrease in tuberculin reactors among grade school children from nearly 50 per cent in 1926 to about 8 per cent in 1944, a decrease of the annual infection attack rate among young children from 3.5 per cent in 1926 to 0.003 per cent in 1944 and a decline in mortality of children during the first five years of life from a high rate in the 1920's to not a single death from tuberculosis in 1945.—*The Establishment and Use of Fundamental Procedures in Tuberculosis Control, J. A. Myers, Pub. Health Rep., November 1, 1946, 61: 1563.*—(*M. Pinner*)

Tuberculosis in Newfoundland.—The tuberculosis mortality in Newfoundland is several times that in England or Canada. The incidence of active pulmonary tuberculosis is between 3 and 4 per cent, more than three times the incidence in England. More than half of the deaths from disease between the ages of 15 and 45 were ascribed to tuberculosis. The mortality from tuberculosis in Newfoundland is greater among females than among males. Despite defects in available statistical evidence, collation of a number of

studies indicate the seriousness of the tuberculosis situation. Factors responsible for the high incidence include poverty, poor nutrition, ignorance, fatigue and especially excessive exposure due to late diagnosis and lack of institutional accommodations. Improved standards of living, especially of housing and nutrition, are urged to raise the resistance of the general population to the tubercle bacillus, but BCG vaccination is not mentioned. Dispensaries, laboratory service, X-ray and specialists to examine suspects, contacts, both of known cases and of tuberculin reacting children, and adult groups of other kinds, are recommended for the identification of potential and actual sources of infection and of cases that might benefit from treatment. Increase in the institutional accommodation for patients from the present 350, which is only 0.75 beds per annual death, is essential, but home care may be improved in the meantime. Social measures to assist the patient and his family, by financial allowances and other forms of social help, and a campaign of public health education and provision of increased medical and nursing personnel are recommended.—*1945 Tuberculosis in Newfoundland, T. O. Garland & P. D'Arcy Hart, Report of a five weeks' visit, Privately printed.*—(*E. Bogen*)

Chest Examinations in Discharged Soldiers.—This is an abstract from a paper by W. W. Lindahl, "Pulmonary Tuberculosis and Other Thoracic Diseases Among Army Separatees." Routine chest photo-roentgenograms were taken of 93,500 soldiers at a Separation Center. There was evidence of tuberculosis in 122 (0.13 per cent). In 50 of these cases the lesions were found to be inactive. There were cavities in 10, and pleural effusion was present in 4; 35 cases of pneumonia and 4 cases of thoracic tumors were detected. The low incidence of thoracic diseases in separatees may be due to the induction screening and medical supervision of the troops.—*Thoracic Diseases among Separatees, (Not signed), Bull. U. S. Army. M. Dept., November, 1946, 6: 544.*—(*O. Pinner*)

Pulmonary Tuberculosis in Medical Students.—The prevalence of significant adult type pulmonary tuberculosis among Harvard medical students was 2.2 per cent. Slightly more than 30 per cent of students entering school as nonreactors became reactors before graduation. Conversion from a nonreactive to a reactive state (to tuberculin) while in medical school carried a liability of more than 5 per cent that the disease would develop before graduation. The number of cases of pulmonary tuberculosis developing in the last two years of school was four times as great as those occurring in the first two years. However, the incidence of acquistion of tuberculous infection, as indicated by the tuberculin test, was approximately the same (12 to 13 per cent) for each year. This indicates that other factors than the opportunity for infection contribute to the development of clinical tuberculosis. The disease often became symptomatic between annual examinations, indicating the rapid progression of lesions, once they have appeared. It is felt that an interval of one year between examinations is too long. In order to detect lesions at an early stage, semiannual examinations are required.—*Pulmonary Tuberculosis in Harvard Medical Students, H. P. Brean & L. W. Kane, New England J. Med., September 5, 1946, 235: 315.*—(*A. G. Cohen*)

Fluoroscopy in Railroad Employees.—Routine fluoroscopy was carried out on 56,541 employees of the *Société Nationale de Chemins de Fer Français;* 13,249 of these were reëxamined one to two years later. Initial examination: normal findings were recorded in 83.9 per cent of cases, abnormal findings in 16.06 per cent (9,088 cases). The classification of the abnormal findings was as follows: negligible pulmonary or pleural anomalies 13.04 per cent, cases of known pulmonary tuberculosis 0.74 per cent, cases of pulmonary tuberculosis picked up by the routine examination and confirmed bacteriologically 0.23 per cent, active pulmonary tuberculosis with negative sputum 0.02 per cent, pleural and pul-

monary lesions necessitating supervision 0.49 per cent, nontuberculous disease 1.54 per cent. The prevalence of previously unknown active pulmonary tuberculosis with positive sputum was 2.28 per cent of all persons examined. The lowest prevalence of previously undiagnosed tuberculosis was found between the ages of 15 and 25. Most cases were found in the age-group between 25 and 50. Among the 129 cases with positive sputum 40 per cent showed bilateral disease. Cavities were demonstrable in 52 per cent of cases. One hundred and seventeen of the 129 cases of open pulmonary tuberculosis could be followed for four years. Review of the results at the end of that time showed that 52 per cent had returned to work and 22 per cent had died. There were 13,249 employees who underwent a second examination one to two years after the initial examination. The prevalence of newly discovered cases with positive sputum was 0.6 per cent (as compared with 2.3 per cent at the initial examination). The incidence varied according to the time elapsed since initial examination.—*Résultats immédiats et éloignés d'examens radiologiques systématiques intéressant le personnel de la Société Nationale de Chemins de Fer Français, (région de l'est), A. Biedermann, A. Alibert, J. Mery, M. Lerolle & P. Paillas, Rev. de la tuberc., 1946, 10: 97.*—(*V. Leites*)

Tuberculosis in Prostitutes.—In 1941 an X-ray survey was conducted in Rio de Janeiro on 1,684 prostitutes; 36 cases of active pulmonary tuberculosis were discovered, including 4 cases of miliary tuberculosis, 4 cases of apical tuberculosis, 2 cases of pleural tuberculosis, 5 cases of ulcero-fibrotic lesions and 21 cases of ulcero-caseous lesions. Mass surveys of the chest should be extended to the totality of the population and should be periodically repeated. The average duration of the "silent phase" of pulmonary tuberculosis is estimated at three years. The distinction currently made between tuberculous infection and tuberculous disease is no longer justified in the light of the knowledge accumulated during extensive roentgenological surveys. Each individual with tuberculous infection is a potential candidate for tuberculous disease.—*Tuberculosis inaparente, A. de Paula, Prensa méd. argent., August, 1946, 33: 1571 and 1721.*—(*L. Molnar*)

Abnormal X-ray Findings in Surveys.—A new and elaborate classification is presented of persons with abnormal pulmonary X-ray findings, as a guide for the practitioner, indicating minimum standards for further observations and final disposition of such persons. Since the main part of this paper is a tabulation, it is not suitable for detailed abstracting.—*Guide for Disposition of Persons with Abnormal Pulmonary Findings on X-ray Films, H. E. Hilleboe, Pub. Health Rep., December 6, 1946, 61: 1759.*—(*M. Pinner*)

Photofluorographic Survey. — Approximately one-half of the population (32,825 persons) of the French town of Montreuil could be persuaded to submit to photofluorographic examination. One hundred per cent of the children were included in this survey; 38.2 per cent of the male population and 48.2 per cent of the female population responded. The percentage of participants was much higher in the economically better situated groups. The incidence of active tuberculous disease, previously undiagnosed, was 0.27 per cent. In an additional 0.37 per cent of cases tuberculous lesions of undetermined activity or of a definitely inactive character were found. Nontuberculous disease was found in 0.08 per cent. —*Le bilan de l'expérience de Montreuil-sous-Bois: radiophotographie systématique de toute la population d'une ville française, M. Fourestier, Rev. de la tuberc., 1946, 10: 54.*—(*V. Leites*)

Stereoscopy.—Stereoscopy may be of considerable assistance in the detection of an abnormal condition and the identification of the disease. It will exhibit its greatest usefulness in mass radiography in those cases in which an existing lesion is so small it may

be hidden by a rib or the clavicle. Recently over 4,000 stereoscopic 4 x 10 cm. films were examined to determine the number of minimal tuberculosis lesions that might be overlooked if single films had been made in mass chest surveys. The group, obtained from several surveys, included a large number of pathological lesions. Six hundred and nine of the group presented evidence of minimal tuberculosis. A little more than one-third of these exhibited lesions considered worthy of further clinical investigation. This ratio of significant to nonsignificant cases is in close agreement with mass case-finding work throughout the United States. In this group of potentially significant films only 7 showed lesions visible in one of the stereoscopic views not seen in the other or 1.1 per cent of the films showing minimal tuberculosis. In 27 other films the lesions were seen to better advantage on one of the stereoscopic pair. Mass chest surveys by the United States Public Health Service and associated groups have shown that approximately one per cent of the population has X-ray evidence of minimal tuberculosis. Thus, one may expect stereoscopy to be of help in only 6 per 100,000 persons examined. This is an insignificant number, especially in view of the personal error of the physician reading the chest films. Since the cost is almost double, the case-finding dollar will go only half as far, thus reducing the number of persons examined and the number of cases of tuberculosis found. It would seem desirable, therefore, that the single film be used for the detection of disease and stereoscopy confined to the identification of the lesions discovered by mass radiography.—*The Value of Stereoscopy in Mass Radiography, I. Lewis & R. H. Morgan, Radiology, February, 1946, 46: 171.*—(*G. F. Mitchell*)

Fluoroscopic Screens.—This is a highly technical discussion of the factors responsible for the persistence of luminescence in fluoroscopic screens.—*The Persistence of Fluoroscopic Screens, W. W. Van Allen, Pub. Health Rep., November 1, 1946, 61: 1583.*—(*M. Pinner*)

Primary Tuberculosis in Adults.—The dogma of universal tuberculous infection in childhood is no longer true. In most places, the greatest amount of tuberculous infection now occurs after school age. Primary infections in later years are not rare and some individuals escape infection altogether. Approximately one-third, occasionally one-half, of the primary infections are accompanied by demonstrable roentgenographic findings, such as hilar adenitis, serous pleurisy, relatively extensive infiltration of the lung, perihilar infiltration and hematogenous dissemination. There appears to be little difference in the immediate reaction between adults and children, except that hematogenous dissemination is more frequent and hilar adenitis and perihilar infiltration are more marked in children. Destructive pulmonary tuberculosis rarely occurs in childhood. The greatest number of cases and of deaths occurs between the ages of 15 and 30. There is no justification for distinguishing between "childhood type" and "adult type." In Norway, the term "reinfection type" is used only in reference to cases of new infection where the original infection is completely extinguished; such cases are very rare. A new infection in an organism where the old infection is still living is designated "superinfection." The time interval between the primary infection and destructive pulmonary tuberculosis is now known to be quite short in most cases; it is generally under five years, often only from one to two years. This has been ascertained by the wide-spread use of tuberculin testing and by using erythema nodosum as the basis for determining the time of infection. Pleurisy most often appears within six months after infection and large numbers of cases of pulmonary tuberculosis follow this manifestation within a few years. There is a wide diversity of opinion on the question of the pathogenetic connection between the manifestations of the primary infection and those of destructive pulmonary tuberculosis. Evidence from pathological anatomy is unsatisfactory and information must be derived from clinical and radiographic data. The conclusions of German investigators that

the subapical *Frühinfiltrat* represented superinfections were formed without regard to the tuberculin reaction. Recent evidence indicates that these *Frühinfiltrate* may well represent primary infections, leading to the further conclusion that destructive pulmonary tuberculosis develops in some cases from a direct breakdown in the area of the primary focus. In other cases, a quiescent primary focus can be reactivated after a long interval. In still other cases, there is evidence that the destructive process begins in an entirely new infiltration at another site. There are thus four different possibilities in pathogenesis: (*1*) direct development from the primary lesion or its immediate surroundings; (*2*) reactivation of latent primary foci; (*3*) metastatic foci of either hematogenous, lymphogenous or bronchogenic origin; and (*4*) new foci caused by superinfection. It is very likely that the two latter types are of much less importance than the two first ones. Little importance is attached to superinfection in the question of health and disease. Age, heredity and environment are the leading factors in the prognosis of a primary infection.—*The Relationship between Primary and Adult Tuberculosis, H. J. Ustvedt, Brit. J. Tuberc., July, 1946, 40: 85.*—(*A. G. Cohen*)

Primary Tuberculosis in Adults.—Most serious, frequently fatal, pulmonary tuberculosis developing directly after primary infection in an adult belong to the primary or secondary stages of the disease, rather than to the common tertiary stage of Ranke. They progress by primary excavation, by rupture of lymph nodes with consequent bronchopneumonic spread, or by miliary or hematogenous dissemination, similar to the course described in infants. Only occasionally, after a short secondary stage, does the patient arrive at the tertiary stage and present an early localized infiltration.—*Les primo-infections tuberculeuses malignes de l'adulte, A. Dufourt, Presse méd., August 31, 1946, 54: 558.*—(*E. Bogen*)

Primary Tuberculosis in Adults.—Routine X-ray examinations and tuberculin tests were carried out on 2,873 young adults (university students, college students and employees of the Ukrainian Tuberculosis Institute). The period of observation ranged from seven months to four years. Two hundred forty-three persons were found tuberculin-negative on initial examination (Mantoux 1:100). In these cases X-ray films and tuberculin tests were repeated at intervals of three months; 92 cases developed positive tuberculin reactions while under observation. Six employees of the tuberculosis institute were found to be tuberculin-negative; they all showed a conversion to a positive reaction within a period of six months. Out of the 243 cases with negative tuberculin reaction, 31 (12.8 per cent) developed active tuberculosis. Among the 2,630 positive tuberculin reactors only 51 (1.9 per cent) developed active tuberculosis while under observation. Among the 31 active primary forms there were 6 cases of primary complex, 8 cases of hilar adenopathy, 13 cases of exudative pleurisy (42 per cent), 3 cases of limited micronodular dissemination in an upper lobe, and one case of bilateral extensive dissemination. The course was benign in most cases. The diagnosis of primary tuberculosis in these cases was based on the observation of a preceding conversion of a negative into a positive tuberculin reaction. Among the 51 cases of active tuberculosis having developed in the group of positive tuberculin reactors a low incidence of exudative pleurisy was noted in contradistinction to the group with primary infection. There was a higher incidence of unilateral disseminated forms.—*Early Forms of Primary Tuberculosis in the Adult, G. S. Ginsburg, Probl. tuberk., 1946, No. 1, 3.*—(*V. Leites*)

Primary Infection.—Comparison of statistical data demonstrates an increase in the incidence of primary infection in contacts during the war; 401 contacts, having a source case in the family, were tuberculin-tested in 1944. The total percentage of tuberculin reactors was 75.06 per cent, as compared to 64.74 per cent, in a similar group in 1940. The increase was particularly evident in the

age group 13 to 15 with an incidence of 54.54 per cent tuberculin reactions in 1940 and 83.82 per cent in 1944. Similarly the incidence of positive reactions at the age of 2 showed an increase from 50 per cent to 66.6 per cent.—*Contribution a l'étude de la primo-infection dans la famille du tuberculeux, H. van den Eeckhout, Rev. de la tuberc., 1946, 10: 18.*—(*V. Leites*)

Chronic Epituberculosis.—Cases of chronic epituberculosis are characterized by a protracted course, long persistence of the X-ray shadows, and absence of clinical symptoms. Bronchoscopic studies revealed the following findings: in cases of epituberculosis with lobar involvement, the orifice of the lobar bronchus showed extreme narrowing due to edema and congestion of the mucosa. The opening was usually obstructed by a very tenacious and dense plug which on microscopical examination was found to consist mainly of macrophages, probably originating from the subepithelial layer of the bronchi. Tubercle bacilli were usually absent. At the stage when X-ray films showed regression of the opacity, bronchoscopy revealed a widening of the bronchial lumen. The bronchial secretions became more fluid and consisted of abundant mucus and leucocytes and a decreasing number of macrophages. The pathogenesis of epituberculosis is thus seen in a process of edema and congestion involving the lobe of the primary complex and the lobar bronchus. The narrowing of the bronchus leads to varying degrees of airlessness in the corresponding lobe. The development of congestion and edema is considered as a manifestation of a state of local hyperallergy produced by the "toxins" from the primary focus. The hypothesis attributing epituberculosis to pressure of enlarged lymph nodes on the bronchus could not be confirmed either by bronchoscopy or by tomography.—*Sur la pathogénie des epituberculoses chroniques, A. Dufourt & P. Mounier-Kuhn, Rev. de la tuberc., 1946, 10: 172.*—(*V. Leites*)

Epituberculosis.—Epituberculosis is defined as a benign form of childhood tuberculosis, characterized by a homogeneous X-ray density and the absence of clinical symptoms. A special form of this condition, designated as "caseous-inflammatory" epituberculosis is described, in which there is cavity formation within the consolidated area. Concomitant clinical symptoms appear and the sputum becomes positive. This development is admittedly very rare, only 5 cases were found among 2,000 cases of different forms of childhood tuberculosis.—*A propos des épituberculoses caséo-inflammatoires de la deuxieme enfance, M. Delord, Le Poumon, January-February, 1946, 2: 24.*—(*V. Leites*)

Perforation of Tension Cavity.—Case report of a patient with bilateral cavitary disease treated with bilateral pneumothorax. After induction of the second (left) pneumothorax and consecutive pneumonolysis there was progressive ballooning of the cavity in the left upper lobe with eventual perforation and death. Autopsy showed a thin walled cavity, 4 cm. in diameter, with a round perforation on its anterior wall, measuring 1 mm. in diameter. The site of the perforation was remote from the insertion of the severed adhesions. The opening could be demonstrated by irrigating the left main bronchus, which also proved the patency of the draining bronchus in the direction towards the cavity. Its patency in the opposite direction could also be demonstrated by injection of methylene blue into the cavity through the perforation. The draining bronchus had a diameter of 3 mm.; it contained no mucous plugs and no valves. The wall revealed a few tuberculous granulations. Thus, no check-valve mechanism could apparently be invoked in this case.—*Étude anatomique d'une caverne balonnée perforée, M. Bariéty & J. Paillas, Rev. de la tuberc., 1944-45, 9: 299.*—(*V. Leites*)

Round Foci.—Fifty patients with isolated pulmonary round foci were studied. The period of observation ranged from one to ten years. In 44 cases a single round focus was present, 6 cases showed multiple foci. Their size varied from 1 to 4 cm. in diameter.

Seventy per cent were situated in the infraclavicular area. It is believed that the round focus is usually not an early manifestation. It arises either as a perifocal pneumonic reaction at the site of an old tuberculous lesion or from a tuberculous cavity after closure of its draining bronchus. The anatomical substratum is considered to be most often a sharply circumscribed area of caseation with remnants of elastic tissue, surrounded by a thin fibrous capsule. Depending on the stage of development the lesion consists of a cheesy mass with partial softening, large accumulations of leucocytes and specific elements in the more acute cases—or in a dry brittle mass containing calcium salts, without leucocytes and specific elements in the more chronic cases. Prolonged clinical observation showed that 56 per cent of the patients had intermittently or persistently positive sputum. The course was varied. Extensive spreads and cavity formation within the round focus were observed in a considerable number of cases. Resolution of the round focus was seen very infrequently and only in fresh cases. Contraction of the foci occurred due to encapsulation and induration. It is emphasized that even in these stages reactivation and subsequent spreads are liable to occur. The prognosis of round foci is considered rather serious. Under pneumothorax treatment no resolution was observed. The favorable effect consisted in an increased induration.—*The Round Tuberculous Focus, T. N. Oleneva, Probl. tuberk., 1946, No. 1, 10.*—(*V. Leites*)

Pulmonary and Endobronchial Tuberculosis.—The treatment of pulmonary tuberculosis in the presence of endobronchial lesions is discussed. The authors are not in favor of primary thoracoplasty. In most cases pneumothorax is not considered contraindicated *a priori*, although it is recognized that endobronchial tuberculosis decreases considerably the chances of success. The main difficulties of pneumothorax treatment in the presence of bronchial involvement are: failure of cavities to close, ballooning of cavities, perforation of ballooned cavities, development of atelectasis. It is believed, however, that pneumothorax can be rendered more effective if combined with auxiliary measures. Good results are said to have been obtained with the puncture of ballooned cavities. Phrenic nerve paralysis in addition to pneumothorax was effective in a number of cases with endobronchial disease, where pneumothorax alone had failed. Bronchoscopic procedures are considered of the greatest importance in improving the effect of pneumothorax, especially if they precede the institution of collapse (silver nitrate applications, ultra-violet rays, bronchoscopic aspiration). Only if all these measures fail, should reëxpansion be attempted and thoracoplasty considered. The generally observed favorable effect of the latter on endobronchial tuberculosis is confirmed.—*Le traitement de la tuberculose pulmonaire associée a la tuberculose bronchique, A. Dufourt, P. Mounier-Kuhn & J. Baron, Le Poumon, September–October, 1945, 1: 285.*—(*V. Leites*)

Premenstrual Fever in Tuberculosis.—The study was undertaken in an attempt to elucidate the significance of premenstrual temperature in women having pulmonary tuberculosis. Fifteen normal healthy young women were used as controls. Their temperature was taken both morning and evening, for ten minutes in the mouth. This was done for at least one whole menstrual cycle. Previous studies had revealed that in the normal woman the body temperature is relatively low during the first and relatively high during the second half of the cycle. Further studies had revealed a relatively high temperature to be characteristic of the premenstrual phase and that it persisted after conception. Such a diphasic change was found in 13 of the 15 normal women studied, the temperature reached a steady maximum beginning a few days before menstruation was due. The average duration of this change was five days. The highest temperature reached was in no case above 99.0°F.; and this occurred in only one instance. In 75 per cent of cases the premenstrual temperature showed no readings above 98.4°F. Of 50 women of child-bearing age with pulmonary tuberculosis premenstrual changes occurred in 43. The reactions were of the

same types occurring in the controls. The average duration of these changes, however, was nine days instead of five, and in 53 per cent the temperature reached was 99.0°F. or over. As soon as the menstrual flow started the temperature reverted to its previous character. In 6 of these patients the characteristic changes were absent when a temporary increase of tuberculous activity occurred. During this exacerbation, shown either by a higher temperature recording or by a bigger variation in the morning and evening temperatures, the premenstrual phase invariably disappeared. One of the 43 patients possessed charts, extending over a period of five years, showing an original premenstrual rise in temperature lasting for fourteen days; now, when the degree of activity of the disease is much less, the rise lasts only for five days. In 4 patients the day preceding menstruation was marked by a sudden extreme rise in temperature. This reaction bears a strong resemblance to a tuberculin reaction. Since the symptoms complained of during the few days preceding menstruation are very similar to those of over-activity of the thyroid gland—irritability, sweating, tremor and nausea—6 patients were given thiouracil 0.6 g. daily starting two days before the expected premenstrual rise in temperature. The temperature change was eliminated and the usual concomitant symptoms were also absent. The author concludes that the normal premenstrual temperature variations are also present in patients with pulmonary tuberculosis in early, as well as advanced cases, but it tends to be more pronounced and of longer duration.—*Significance of the Premenstrual Fever in Pulmonary Tuberculosis, R. Grenville-Mathers, Brit. M. J., April 6, 1946, 1: 523.*—(*D. H. Cohen*)

Symptoms in Pulmonary Tuberculosis.—Since the introduction of mass miniature radiography there has been a body of medical opinion, maintaining that it would be more productive of results and more economical of personnel to concentrate the use of mass radiography machines on the examination of those sections of the population presenting symptoms suggestive of chest disease. It is generally accepted that the number of persons found by orthodox mass radiography to have significant lesions is in the region of 1.3 per cent. This figure can be subdivided into observation cases, 1.0 per cent, and treatment cases, 0.3 per cent, and it has been found that approximately two-thirds of the first group and one-half of the second group are symptom free. In order to arrive at a figure for the number of the general population having such symptoms as might be indicative of disease of the chest, a questionary was presented to 5,308 persons passing through a mass X-ray unit for one month. There were nine questions: (*1*) have you a cough of one or more months' duration; (*2*) any phelgm; (*3*) have you coughed up any blood recently; (*4*) have you any pain in your chest; (*5*) are you more short of breath than you were six months ago; (*6*) are you losing weight; (*7*) are you feeling off color or tired; (*8*) have you had "flu" or frequent colds recently; and (*9*) have you seen a doctor for any of the above complaints. It was found that the predominant symptom in men was cough (16.1 per cent) and in women lassitude (12.1 per cent), and that 36 per cent of all those interviewed presented one or more of the symptoms listed. This figure approximates very closely that for the proportion of persons found by mass radiography to have significant lesions with symptoms—thus indicating that symptoms in themselves are not likely to be of great assistance in the discovery of previously undiagnosed pulmonary tuberculosis. It should be further noted that only one-sixth of those complaining of symptoms consulted their doctor. The author concludes that it would appear that the most practical way to employ the limited number of mass miniature radiography machines at present available is on routine mass radiography during the greater part of the week, while arranging for them to be used to X-ray such groups as "symptom cases" referred to the clinic and contacts of positive cases on one afternoon a week.—*Significance of Symptoms in the Diagnosis of Pulmonary Tuberculosis, W. P. Dick, Brit. M. J., April 13, 1946, 1: 571.*—(*D. H. Cohen*)

Bronchoscopic Treatment.—The various bronchoscopic procedures in the treatment of tuberculosis are reviewed. No major effects are attributed to simple bronchoscopic aspirations. Other manipulations, aiming at the restoration of bronchial patency, are more important and consist in removal of viscous and stagnant secretions and crusts and abrasions of endobronchial granulations and vegetations. Catheterization of the bronchi of second and third degree, in view of their dilatation, is considered with scepticism, especially in cases with organic stensosis. The possibility of releasing a viscero-motor reflex by introducing a bronchial catheter is not excluded; the occasional closure of ballooned cavities after bronchoscopy is taken as a proof for such mechanism. The value of bronchoscopic treatment of endobronchial infiltrations, ulcerations and edema is questionable. Excessive repetition and too close intervals should be avoided. The traumatization inherent in many procedures may have the opposite from the desired effect, increasing the degree of obstruction by inflammation and provoking spread of infection.—*Bronchoscopo-thérapie et tuberculose pulmonaire, A. Soulas, Le Poumon, May–June, 1946, 2: 173.*—(*V. Leites*)

Cardiospasm in Tuberculosis.—In the tuberculous patient, cardiospasm is usually the result of a derangement of the vegetative nervous system; it responds well to atropine. Occasionally it has been reported that abnormal conditions of the diaphragm have given rise to cardiospasm. One patient was cured by phrenicectomy. The case reported had, in addition to cardiospasm, a fibroid tuberculous process of the upper lobe on the right, with marked shrinkage of that lobe, and displacement of the heart and upper mediastinum to the right. The combination of increased intra-esophageal pressure due to cardiospasm, and the negative pressure on the outside of the esophagus due to the fibrotic pulmonary process led to a large diverticulum which appeared on planograms as a peculiar air-containing paratracheal structure. Administration of contrast material confirmed the diagnosis.—*Kasuistischer Beitrag zum Cardiospasmus, M. Chauvet, Schweiz. med. Wchnschr., November 30, 1946, 76: 1227.*—(*H. Marcus*)

Pernicious Anemia and Tuberculosis.—The concurrence of pernicious anemia and pulmonary tuberculosis is rare. Miliary tuberculosis is a somewhat more common complication. At the Minneapolis General Hospital a recent survey revealed only one case of tuberculosis among 235 patients affiicted with pernicious anemia. This patient, a female, aged 60, had miliary tuberculosis of the bone marrow. Examination of the bone moarrow had been done for confirmation of the diagnosis of pernicious anemia because of the refractory behavior of the anemic state to adequate dosage of parenteral liver extract. Pernicious anemia was confirmed, the finding of tuberculosis being incidental. Histological examination of up to 100 marrow units showed a few tubercles mostly of the hard type. Acid-fast bacilli were found in one large necrotic tubercle. On admission to the hospital the chest X-ray film showed a "pneumonic" process in the lower lobe of the left lung. The Mantoux test was strongly positive. A later X-ray film of the chest now showed an "apparently healed Ghon tubercle but no evidence of an active tuberculous process." Repeated examination of small amounts of sputum showed no tubercle bacilli, but several gastric washings yielded large numbers of acid-fast bacilli. Chest films taken three months after discharge from the medical service were reported as negative for tuberculosis.—*Pernicious Anemia and Miliary Tuberculosis of the Bone Marrow Organ, E. M. Schleicher, Am. J. Clin. Path., September, 1945, 15: 402.*—(*J. S. Woolley*)

Chemistry of Chronic Lesions.—Three constituents of the tubercle bacilli were studied in an attempt to determine the agent responsible for the characteristic mononuclear cell reaction. Polysaccharides were found to produce only a transient polynuclear reaction. Extracts of the total fats in the bacilli injected subcutaneously in guinea pigs produced first a poly- then a prolonged mononuclear response,

in no way differing from the response to injection of killed whole bacilli. In comparable concentration each of the various fatty acids engendered a similar pathological reaction, suggesting a nonspecific character of the reaction. Soluble proteins, like the polysaccharides, produce a transitory polynuclear response, whereas insoluble proteins prepared by the hydrochloric acid method of Laporte, incite a mononuclear reaction indistinguishable from that produced by injection of whole bacilli. Of further significance is the demonstration that, in equivalent doses, the insoluble proteins of Koch's bacilli produce mononuclear reactions much more rapidly than simple insoluble proteins, for example, horse serum proteins coagulated by heat. Conclusions seem justified that chronic tuberculous lesions are caused by at least two factors: the lipoid constituents and the insoluble proteins of the tubercle bacillus.—*Les facteurs chimiques dans la genèse des lésions tuberculeuses chroniques, A. Delaunay, R. Vendrely & J. Pages, Ann. Inst. Pasteur, July–August, 1946, 72: 607.*—(*P. Q. Edwards*)

Tubercle Bacilli in Tuberculous Lesions.—The problem of the quantitative distribution between living and dead bacilli in tuberculous lesions is investigated. Method: two small equal fragments of a tuberculous lesion are removed; one of them is in its entirety used for inoculation on Löwenstein's medium. The number of colonies obtained is taken as an indication of the number of living bacilli at the moment of inoculation. The other fragment is divided up into slides (400 to 700), of which every twenty-fifth is stained. The number of microscopically visible bacilli in the slide is determined, which permits an estimate of the total number of bacilli in the whole fragment. Comparison is made between the number of colonies and the number of microscopically visible bacilli. Thirty-three fragments of tuberculous lesions were examined, originating from 19 cases of chronic pulmonary tuberculosis in adults and 3 cases of miliary tuberculosis in children. The possible causes of error of this method are discussed. The results are evaluated as follows: the examination of 10 specimens did not permit to draw any definite conclusion. In 11 cases the bacillary content of the lesions was extremely low (old lesions, perifocal type of inflammation) and the least cause of error would have changed the results fundamentally. In 9 other cases the culture medium was entirely covered by colonies which did not permit the estimate of the actual number of living bacilli. In the remaining 14 cases, where a definite proportion could be established, it appeared that the number of microscopically counted bacilli was considerably higher than the number of colonies. In one case it was double in another quadruple, which is still considered within the limits of possible error. In all remaining cases, however, the proportion was 6:1, 10:1, 30:1, 50:1, 100:1, 2000:1, 3000:1, 5000:1, 10,000:1, 60,000:1. In 2 cases not one single colony was present, whereas the number of visible bacilli was 960 and 250,000 respectively. It is concluded that in many tuberculous lesions the number of dead tubercle bacilli is markedly higher than that of living bacilli. It may even happen that all visible bacillary bodies are dead. The observation is made that tuberculous lesions of a more nonspecific inflammatory character are much richer in tubercle bacilli than typically tuberculous tissue (epithelioid and giant cells). The opinion is advanced that the death of tubercle bacilli, the disintegration of their capsule with liberation of the pathogenic constituents is the origin of those processes which are considered specifically tuberculous.—*Les bacilles de Koch existants dans les lésions des phtisiques sont-ils vivants ou morts?, G. Canetti, Rev. de la tuberc., 1946, 10: 26.*—(*V. Leites*)

Indications for Collapse Therapy.—Selection of the proper surgical procedure in a given case in which collapse therapy is indicated is of the utmost importance for good end results. While it is admitted that certain patients represent problems which do not readily fall into the main classification, most surgical cases can be classified under two main headings: (*1*) Thoracoplasty is advised in cases which are

relatively inactive. The process is mainly fibrotic and one or more small cavities may be present. If a large cavity is present under the same circumstances, preliminary Monaldi drainage, followed by thoracoplasty, is the treatment of choice. (*2*) If the process is active and progressive, with cavity formation under observation, extrapleural pneumothorax is advised. No routine procedure is performed in any given case. Thoracoplasty may be performed as a six to eight-rib upper-stage operation, or Maurer's four or five-rib operation with transposition of the scapula may be used. If prelimiary Monaldi drainage is done, it is always wise to resect the anterior ribs first and institute drainage after the costectomy scar is well healed.—*Beitrag zur Kollapstherapie der Lungentuberkulose, M. Arnold, Schweiz. med. Wchnschr., November 30, 1946, 76: 1221.*—(*H. Marcus*)

Ballooned, Inert and Residual Cavities.—Ballooned cavities were mostly observed after collapse therapy, especially pneumothorax and pneumonolysis. The spontaneous development was either healing or perforation. Closure of the cavity is not considered infrequent and a waiting period of two months is advised before discontinuing pneumothorax. It is believed that check valve mechanism is not always sufficient to explain the ballooning process. In certain cases the intracavitary pressure is found to be atmospheric and not influenced by intracavitary insufflation and deflation. The pathogenesis is seen in a spasm of the bronchioles due to a reflex mechanism elicited from the tuberculous lesion itself or from the pleura (refill, pneumonolysis). If the diagnosis of ballooned cavity is made before institution of active therapy, an attempt at pneumothorax should be the first step, followed by pneumonolysis if necessary. Favorable results with disappearance of the ballooning mechanism were observed in one-third of such cases. Inert cavities are cavities not influenced by a good pneumothorax of several months duration. Three causes are distinguished: (*1*) The lack of retractability of the pericavitary lung tissue, (caseous pneumonia or tuberculous bronchopneumonia). (*2*) The cavity is situated in an area of old indurated tuberculous tissue, preventing an adequate collapse. (*3*) Inert cavities due to check-valve mechanism as described above. In a centrally located cavity pleural irritation with injection of gold salts is advised. Residual cavities are seen mostly after thoracoplasty and are frequently slit-like in appearance. Differential diagnosis has to be made between residual cavity and bronchiectasis or emphysematous bleb. It is believed that the incidence of residual cavitation can be reduced by using more frequently thoracoplasty with apicolysis. Additional procedures such as revision, Monaldi drainage, cavernostomy and resection should be considered.—*Les cavernes balonnées, inertes et residuelles, R. Even & J. Lecoeur, Rev. de la tuberc., 1946, 10: 109.*—(*V. Leites*)

Phrenic Paralysis.—This is a review of 186 cases of phrenico-exeresis performed at the Sanatorium of Huipulco from 1936 to 1944; 89 patients were males and 87 were females. The operation was performed 98 times on the right side and 88 times on the left side. One hundred and fifty-three cases presented fibrocaseous lesions, 72 of which were predominantly in the apex, 41 at the base and 40 showed extensive bilateral lesions. Thirty-four cases with exudative tuberculosis were operated on, in 17 of which the lesions were limited to the apex, in 12 to the base, and 5 patients had extensive lesions. In 87 cases phrenico-exeresis was the only surgical procedure; in 24 of these cases a pneumoperitoneum was done to complement the phrenic paralysis. In 6 cases phrenico-exeresis preceded thoracoplasty, while in 35 cases it aided the effect of pneumothorax; in 30 cases the phrenic nerve was paralyzed in addition to thoracoplasty; in 7 cases phrenico-exeresis was associated with extrapleural pneumothorax and, finally, in 14 cases it followed plombage. Roentgenological evidence of good results was obtained in 49 cases, most of them with basal lesions of a predominantly exudative character. Sputum conversion occurred in 58 cases.

Considering only the 87 cases in which the phrenic paralysis was the only surgical procedure, X-ray evidence of improvement was seen in 26 cases, mostly in those cases associated with pneumoperitoneum. Among the 92 cases of phrenico-exeresis associated with other collapse therapeutic measures the best results were seen in those with pneumothorax. Good results were obtained with phrenic paralysis following the reëxpansion of the lung after pneumothorax. These data bear out the general opinion considering the paralysis of the phrenic nerve an unreliable method, the indications and prognosis of which cannot be rationally established.—*Estudio critico de la frenicectomia, F. Rebora, Rev. mex. de tuberc., March–April, 1946, 8: 109.*—(*L. Molnar*)

Pneumoperitoneum with Phrenic Paralysis.—In three years' observations on 89 cases in which pneumoperitoneum had been combined with temporary or permanent phrenic paralysis, the results, verified by tomography and repeated sputum examinations, were as follows: In 58 lesions of the lower lobe, 31 successes. In 17 lesions of both lower and upper lobe, 6 healed in the lower lobe without important change in the upper lobe, one healed in both locations, 10 were without effect. In 14 diffuse lesions of the entire lung, 4 successes and 10 failures. In 7 cases with cavity in the upper lobe, only one improved. In 2 cases of draining tuberculous pleurisy, both failed. It is concluded that pneumoperitoneum aids the action of phrenic paralysis when that is indicated, which is chiefly in lesions of the lower lobes.—*Valeur du pneumoperitoine complementaire de la paralysie operatoire du diaphragme, M. F. Magnin, Presse méd., August 31 1946, 54: 562.*—(*E. Bogen*)

Duration of Pneumothorax.—A change of ideas on duration of pneumothorax has taken place in French phthistiology, since Dumarest in 1929 advised indefinite maintenance of a satisfactory pneumothorax. Rist in 1930 recommended five years of effective pneumothorax treatment as safe and sufficient in most cases. Observations indicate that a great number of patients receive refills for a longer period than five years. Among 95 such cases 15 per cent developed pleural complications after the fifth year, one-third of these complications were of a serious nature. It is felt that the theory of the necessity of a five-year treatment should at present be reconsidered for the following reasons: to-day pneumothorax is instituted earlier and for more limited lesions than in the past. The proportion of pneumothoraces improved by pneumonolysis has greatly increased. Tomography permits better observation of the lesions in the collapsed lung. The duration of pneumothorax should be adapted to each individual case and a rigid formula such as "a minimum of five years" is not justified.—*Sur la durée du pneumothorax thérapeutique intrapleural, E. Bernard & J. Weil, Rev. de la tuberc., 1946, 10: 137.*—(*V. Leites*)

Fever after Refills.—Fever up to 103° to 104° following pneumothorax refills was observed in certain cases with good collapse, controlled lesions and dry pleural space. Since no pleural or pulmonary origin of the fever can be invoked in these cases, the fever is probably due to a disturbance of the vegetative nervous system, with predominance of sympathetic stimulation. In 3 such cases the febrile reaction could be eliminated by two subcutaneous injections of yohimbine, (10 mg.), administered immediately after the refill and before the presumed onset of the fever.—*Fièvre nerveuse de réinsufflation, R. Even & J. Lecoeur, Rev. de la tuberc., 1946, 10: 36.*—(*V. Leites*)

Empyema in Pneumothorax.—Among 450 pneumothorax cases under observation the incidence of empyema was 6.6 per cent. Two main groups were distinguished: (*1*) empyema cases without evidence of a bronchopleural fistula; (*2*) empyema with demonstrable bronchopleural fistula, the perforation being latent, intermittent or widely open. The first group of cases with "closed pleural space" is divided in three subgroups: (*a*) so-called pleural "cold abscess," characterized by empyema rich in tubercle bacilli, developing slowly and with a

minimum of clinical symptoms in cases with initially clear serous effusion; (*b*) tuberculous empyema with sudden onset, accompanied by high fever and marked constitutional symptoms; (*c*) tuberculous empyema complicated by mixed infection. An outline of the treatment of these various forms is given, illustrated by case histories.—*A propos de 30 cas de pleurésies purulentes du pneumothorax, valeur du drainage avec aspiration continue, M. Bertheau, Le Poumon, March-April, 1946, 2: 101.—(V. Leites)*

Complications of Pneumothorax.—The authors do not believe that the complications usually ascribed to prolonged pneumothorax treatment, such as thickening of the pleura, hemorrhagic pleurisy and empyema, are actually due to the pneumothorax itself, that is, to the presence of air in the pleural cavity and the prolonged traumatization of the pleura by refills. The incidence of pleural complications is not considered higher in old pneumothoraces than in cases of recent pneumothorax or after reëxpansion. A series of other conditions is described, which are considered real complications of prolonged pneumothorax treatment. One of them is anoxemia, occurring as a late complication of pneumothorax and manifesting itself by anorexia, progressive weight loss without apparent cause, and sometimes asthenia and fever. This condition is apt to develop in cases with excessive collapse or extensive lesions. Improvement can be achieved by partial reëxpansion. These patients should not be treated at high altitudes. Another disadvantage of pneumothorax is seen in its unfavorable effect on endobronchial lesions. In tuberculosis associated with bronchiectasis, pneumothorax may impair drainage and increase the degree of bronchial dilatation and retention. Bronchoscopic aspiration may give good results in these cases. If this is ineffectual the degree of collapse should be reduced or reëxpansion considered. Subsequent resection may be necessary. Another complication is observed in cases with narrowing of the large bronchi in which pneumothorax will increase the degree of stensosis. To those who are apprehensive of the risks of prolonged pneumothorax treatment the authors retort that although continuation of pneumothorax is associated with certain dangers, the interruption of pneumothorax does not necessarily eliminate them. These dangers are: (*1*) Postpneumothorax empyema due to active pulmonary lesions. The lesions may never have been completely controlled by pneumothorax and reactivation sets in after reëxpansion or there may be formation of new lesions in the reëxpanded lung. If the diseased area is peripherally located there is great danger of perforation with formation of a partial pneumothorax and subsequent pyogenic infection. (*2*) Postpneumothorax empyema of pleural origin; in cases of so-called fibrothorax latent residual fluid collections are often present, recognized or unrecognized. Intercurrent diseases or break-down of the general resistance may lead to the development of mixed infection in these fluid pockets. If early treatment is not instituted the breakthrough of the septic fluid into the bronchial tree has been observed repeatedly by the authors as late as ten to twenty years after reexpansion.—*La pathologie tardive du pneumothorax artificiel, F. Dumarest & H. Mollard, Le Poumon, May-June, 1946, 2: 129.—(V. Leites)*

Open Pneumonolysis.—In 1925 Alexander, reviewing all reported cases, reported "that thoracoplasty is preferable to pneumothorax which must be preceded by so risky an operation as open intrapleural pneumonolysis." But he wrote again in 1937, "developments in the technic of open intrapleural pneumonolysis have made the operation a valuable one for a small group of patients." The author reports 15 cases of open pneumonolysis without contralateral spread or activation of disease, and success in every case. There was no morbidity, no wound infection, and no empyema. Brief transcripts of these cases are given. All adhesions are released in the endothoracic fascial plane. This prevents injury to the lung. All bleeding points are sutured with silk. The ribs are approximated with one

braided silk suture passed through the ribs and not around them. No attempt is made to close the pleura or intercostal space. Chest wall is closed with interrupted silk sutures throughout. The pneumothorax space is adjusted by air introduced by syringe and needle. On return to the ward patients are given 30,000 units of penicillin every three hours. Carbon dioxide inhalations are given every three hours and patient is turned frequently. Oxygen tent is used for first twenty-four hours. Bronchiolar spasm is relieved by adrenalin in oil. Air refills are given as necessary under fluoroscopic or radiographic control. Aspiration of intrapleural fluid is done when needed. Patients are usually discharged in ten to fourteen days. It is important that open pneumonolysis be avoided in that group of patients where complications are frequent. It is commonly agreed that pneumothorax should not be done at all in those with a large tension cavity; when either fibrotic or tuberculous stenosis exists; or when atelectasis occurs. Rigid indications for open pneumonolysis are used. Those adhesions not severed by closed method were studied with open pneumonolysis in mind. Adhesions may not be too extensive or numerous; area of adherence to chest wall or mediastinum should not exceed an area equal to operator's palm; and there must be no evidence of pleural exudate, tubercles or pleuritis. True pleural effusions contraindicate open operation but small transient effusions will not.—*Open Pneumonolysis, O. C. Brantigan, J. Thoracic Surg., October, 1946, 15: 341.*—(*W. M. G. Jones*)

Extrapleural Pneumothorax.—Extrapleural pneumothorax is not new in the treatment of pulmonary tuberculosis, but the method of management has been developed during the past five or six years and, following the work of Graf and Schmidt, it has come into widespread use. Indications for it have not been definitely set forth and vary with the men using it, but it has been offered to a group of patients not suitable for other procedures with the hope that it would either arrest their disease or improve their condition so that thoracoplasty could be employed. It is believed that extrapleural pneumothorax is indicated where collapse therapy is desirable but satisfactory intrapleural pneumothorax is unattainable and thoracoplasty is contraindicated. Most are cases having bilateral disease or toxemia due to exudative destructive disease contraindicating thoracoplasty. Extrapleural pneumothorax *can* be made the most selective of all types of collapse. The patient should be fluoroscoped every five hours for thirty-six hours following the operation and refills given as often as necessary to maintain the space. For the remainder of the week daily fluoroscopy and refills suffice. The pressure is gradually increased to produce more collapse. The sero-hemorrhagic exudate which forms, partially filling the space, is aspirated on the fifth or sixth day. If the space is not dry at the end of three or four weeks a tuberculous or pyogenic infection should be suspected. The immediate complications include rupture into cavities or pulmonary tissues, necessitating immediate abandonment of the operation, hemorrhage, shock, subcutaneous emphysema, rupture of cavities near the periphery, wound infection, contralateral spread, loss of the space and atelectasis of the lower lobe. Forty-eight patients are reported in whom 51 lungs were collapsed. The operation was successful in 88.4 per cent; there were no complications in 64.4 per cent and there was conversion of sputum in 75 per cent. There were no deaths from the operation; the late fatality was 8.3 per cent.—*Extrapleural Pneumothorax in the Treatment of Pulmonary Tuberculosis, F. H. Alley, Radiology, May, 1946, 46: 470.*—(*G. F. Mitchell*)

Extrapleural Pneumothorax.—Extrapleural pneumothorax was performed in 54 cases during a period of six years. Intrapleural pneumothorax had been attempted previously in all but one case, and 12 had had phrenic nerve operations. Every patient had a cavity on the operated side and changes of varying extent on the other. In some, thoracoplasty was considered but not done because of the instability of the contralateral lesions. In the

others, there was absolute indication for extrapleural pneumothorax. The operation is less formidable than thoracoplasty. Cases are preferred in which the lesions do not extend below the fifth rib posteriorly. Otherwise, the size, character and position of the lesions is immaterial. If conditions change, a thoracoplasty can be done later. The following are special indications for extrapleural pneumothorax: (*1*) severe toxemia; (*2*) relatively recent infiltrative disease; (*3*) age of patient—ages below 14 (because of spinal deformity) and over 50 are contraindications for thoracoplasty; (*4*) for control of hemorrhage; (*5*) large cavities situated in centre of apex of lung which tend to flatten out against mediastinum in thoracoplasty; (*6*) active disease of opposite lung; and (*7*) low vital capacity. In two-thirds of the cases, the spaces became obliterated after four years. Many of these patients remained well. In the cases where the space persisted, all but one did well. In 11 cases there was tuberculous infection of the extrapleural space and in 4 cases there was non-tuberculous infection. There were 8 deaths (14.8 per cent); one was due directly to the operation, 4 to spread soon afterwards and 3 to spread at least four years afterwards.—*Extrapleural Pneumothorax in the Treatment of Pulmonary Tuberculosis, H. Reid, Thorax, December, 1946, 1: 211.*—(*A. G. Cohen*)

Extrapleural Pneumothorax.—A follow-up is given of the 13 survivors of 17 cases of extrapleural pneumothorax which were started between 1939 and 1941. Some had been treated by extrapleural pneumothorax alone, some by extrapleural pneumonolysis according to Sebestyen and some by both methods combined. Of the 13 survivors, 2 died of pulmonary or gastro-intestinal complications eighteen and twenty-six months after operation. Eight had a positive sputum, 3 had a negative sputum and in 2 no sputum could be obtained. In 6 cases the treatment had to be abandoned because of complete symphysis or other complications. In 5 cases the treatment was discontinued as the lesion for which it had been started was apparently cured. One is still maintained and one other case died while under treatment. Contralateral lesions were observed in 4 cases. A phrenicectomy and pneumoperitoneum were done in one case and a phrenicectomy alone in another case. Despite apparent closure of the cavity and disappearance of expectoration, gastric contents contained acid-fast bacilli in many cases. The authors come to the conclusion that extrapleural pneumothorax has to be maintained for at least two years. If the cavity is not closed within six months this treatment, even if maintained for a long time, will not result in final closure and should be abandoned. In cases in which the extrapleural pneumothorax was discontinued because of apparent healing of the lesion, healing has persisted after a period of observation which varies from one and one-half to four years.—*Pneumothorax extrapleural, Evolucion de los casos comunicados en 1941, R. F. Vaccarezza, O. A. Vaccarezza & J. Rey, An. Cáted. de pat. y clin. tuberc., June, 1945, 7: 125.*—(*W. Swienty*)

Extrapleural Pneumothorax and Penicillin.—Two case reports of extrapleural pneumothorax complicated by staphylococcus infection. In the first case penicillin was administered locally through a tube (total amount 170,000 units), and intramuscularly in the second case (total amount 920,000 units). In both cases the treatment was considered as life saving. The infection was brought under control, and the extrapleural space could be maintained.—*Traitement de deux complications de pneumothorax extrapleuraux et leur sauvetage par la pénicilline, M. Averous, Rev. de la tuberc., 1944–45, 9: 303.*—(*V. Leites*)

Extrapleural Pneumonolysis.—A case of pulmonary tuberculosis is reported with a large cavity in the right upper lobe which failed to close after induction of pneumothorax and a two-stage intrapleural pneumonolysis. The lung was entirely adherent to the mediastinum. A two-stage extrapleural mediastinal pneumonolysis was performed liberating the ung from the apex to the diaphragm. During the second stage it became necessary to sever

the phrenic nerve. Six weeks later the cavity was not demonstrable on X-ray films and there was conversion of the sputum. The authors have performed 95 extrapleural pneumonolyses, 26 of these along the mediastinal surface. No serious complications were encountered.—*Désinsertion extrapleurale du médiastin en deux temps avec phrénicectomie de nécessité, J. Braillon, Rev. de la tuberc., 1946, 10: 32.*—(*V. Leites*)

Instrument Tray for Chest Surgery.—A simple instrument tray is illustrated which fits the contour of the hip or the thigh of any patient in the latericumbent position which is in common use for many types of operations. The legs of the tray are pliable and adjust to any hip. It may be used under the sterile drape or on top of it. Illustrations are self-explanatory.—*An Accessory Instrument Tray, Beatrice H. Aufses, J. Thoracic Surg., August, 1946, 15: 293.*—(*W. M. G. Jones*)

Support for Patients during Chest Operations.—The author gives detailed description with diagrams of a simple adjustable wooden support or trough in which the patient lies during thoracoplasty or similar operation. It can be made by any carpenter and should be welcomed by the thoracic surgeon who has experienced difficulty in keeping the patient's position firm on the operating table.—*A Thoracic Support, W. Spickers, J. Thoracic Surg., April, 1946, 15: 145.*—(*W. M. G. Jones*)

Primary Thoracoplasty.—Thoracoplasty without previous attempt at artificial pneumothorax is advocated in cases with unilateral apical cavitation on the ground that it is more certain, complete and permanent, less prolonged and expensive, and less risk of premature discontinuance or mismanagement. The surgical procedure is simpler and safer if undertaken without preliminary pneumothorax, which, if not associated with pleural infection or contralateral spread may still involve dangerous delay while the air is being absorbed, and consequent extension of the lesion requiring more extensive collapse.—*A Plea for Preferential Thoracoplasty in Early Apical Cavitation in Pulmonary Tuberculosis, P. L. Deshmukh, (Bombay), Antiseptic (Madras), March, 1946.*—(*E. Bogen*)

Results of Thoracoplasty.—A statistical review of 210 thoracoplasties is given, performed in Passy, France, between 1943 and 1945. The results were evaluated after a time interval of six months to three years, and were classified as complete, favorable, insufficient and poor. Complete results (60 per cent of cases) are defined as having no evidence of cavitation on X-ray films (including tomography), and a repeatedly negative sputum. Favorable results (16.2 per cent of cases) had X-ray findings as above, but the sputum was not negative, possibly due to contralateral lesions. As favorable results were also classified cases having presented very extensive cavitation preoperatively, which had been reduced by thoracoplasty to a residual slit. Insufficient results were obtained in 11.4 per cent of cases, the cavity having failed to close. In 5 of these cases subsequent Monaldi drainage or cavernostomy brought the disease under control. Thus, the total of good results was 83 per cent; and 12.4 per cent of cases were classified as poor results (persistence of active lesions, spreads). This group also includes 18 deaths. Postoperative complications occurred in 32 cases, and was mainly due to postoperative flare-ups and spreads, rupture of the pleura during operation, pneumothorax pleurisy on the contralateral side and wound infection.—*Statistique de 210 thoracoplasties pratiquées en deux ans dans un centre sanatorial, H. Joly & C. Carcopino, Le Poumon, July–August, 1946, 2: 237.*—(*V. Leites*)

Complications of Thoracoplasty.—The incidence of fatal complications after thoracoplasty is estimated at about 3 per cent. The fundamental aspects are distinguished: (*1*) massive pneumonia of the lower lobe on the side of operation; (*2*) asphyxia due to pulmonary edema. These forms of postoperative pneumonia are considered similar in character to those described by Virchow as "hemorrhagic

pneumonia," *Spritzpneumonia* and found in the victims of Koch's tuberculin therapy. Thus, an important number of postoperative pneumonias are probably the result of autotuberculinization, caused by traumatized tissue. The starting points of these reactions are old fibrocaseous foci considered as arrested and often even invisible. Although no conclusive evidence is as yet available, the preoperative administration of anti-histamine substances (described as 2339F) is advised. Another group of postoperative pneumonias is caused by bronchogenic aspiration. The unfavorable action of phrenic nerve paralysis in patients undergoing thoracoplasty is not only attributed to the inhibition of expectoration and stagnation of secretions, but also to the elimination of the sympathetic fibers within the phrenic nerve (cholinergic, adrenergic, histaminergic). The inhibition of their action cannot be without important consequences on the vegetative control of lung tissue, which may be the most important factor in the development of lesions. But these points are admittedly hypothetical.—*A propos des complications des thoracoplasties: Comment on peut les prevenir, J. Rolland, Rev. de la tuberc., 1946, 10: 117.*—(*V. Leites*)

New Incision for Thoracoplasty.—The author points out that the usual scapula-mobilizing incision cuts through the thick muscle mass of trapezius and rhomboids, latissimus dorsi and part of the serratus magnus. This is objectionable from several standpoints: hemorrhage is often considerable; the posterior scapular artery on deep aspect of the rhomboids is often divided; part of the muscle has its nerve supply cut and becomes atrophied and fibrous; cut muscle is indifferent or poor material to suture, and rupture opens extrafascial spaces to the exterior; function of these cut muscles cannot be perfect, especially when subjected to repeated section. The modification suggested here has been used for a year and seems to avoid most of these disadvantages. The usual curved incision is made down to, but not through, the muscles of the back. The vertical part of the incision is made two finger breadths from the mid-line. The medial flap is now undercut its whole length, exposing most of the trapezius to within 2 inches of its lowest origin. The latissimus dorsi is sectioned as usual, but the trapezius only across its lowest fibers. With a finger the rest of the trapezius muscle is now separated from the aponeurosis covering the erector spinae muscles, and with scissors or knife, it is cut as near as possible to the spinous processes. This division of the trapezius close to the mid-line is carried right up to the top of the wound. The rhomboid muscles are raised with the trapezius; the serratus posterior superior may be included, or left on the ribs, as desired. As this aponeurosis of the trapezius is being cut one should watch for and secure the medial divisions of the posterior branches of intercostal vessels and for the lateral divisions of the same as the flap is displaced forward. At the end of the operation the muscle layer is sewed back to its original attachment to the spinous process and its ligaments. This is easy to do and only one layer of sutures is needed, although a few interrupted reinforcing sutures may be added. Reopening of the wound in the same manner is equally easy and quite bloodless. By this method the disadvantages mentioned before are avoided; exposure is improved; the two suture lines are not superimposed; bleeding is less.—*A Musculoplastic Incision for Posterior Thoracoplasty, R. C. Brock, J. Thoracic Surg., June, 1946, 15: 182.*—(*W. M. G. Jones*)

Revision Thoracoplasty.—A study of 89 revision thoracoplasties was made to determine why these patients failed to have satisfactory collapse of the lung, what could be done to insure better thoracoplasty results and what should be done in cases which do not respond satisfactorily to the classical thoracoplasty. Of the 62 patients with unilateral caseous pneumonic tuberculosis, a revision thoracoplasty failed to have satisfactory results in 47 (75.8 per cent). In the group of cases in which classical paravertebral thoracoplasty should give about 90 per cent satisfactory results, those with cavities in the upper outer

division of the lung field, the revision operation was unsuccessful in about two-thirds of the cases. Other factors than cavity location are significant in thoracoplasty failure. Causes of failure in the original operation in the 62 unilateral cases were: pneumothorax still present, (10 cases); thickened parietal pleura, (9 cases); anterior position of cavity, (9 cases); marked fibrosis of lung, (7 cases); inadequate or inopportune surgery, (12 cases); giant or parahilar cavities, (9 cases). Revision operation was uniformly successful only in those cases in which long posterior rib stumps had been left intact at the first operation; in all other cases the percentage of successful revisions was 24.2. Results of revision thoracoplasty in 27 patients with bilateral disease were essentially similar: approximately two-thirds of the patients having cavities in the upper outer segment of the lung did not benefit by revision operation; complete failure obtained in 4 cases having pulmonary fibrosis and in another 4 with markedly thickened parietal pleura; inadequacy of the original operation provided 4 successes in 8 cases. Death occurred in 24 of the 89 patients: 27.4 per cent in the unilateral, 26.0 per cent in the bilateral group. Acute postoperative spread, shock and hemorrhage caused deaths immediately; extension of the disease, debility following additional surgical procedures, progression of uncontrolled disease and one suicide accounted for the later deaths. Because of the low percentage of successful revision thoracoplasties and the high mortality rate, other means of controlling the disease should be adapted whenever possible.—*The Revision Thoracoplasty: A Study of 89 Cases, L. A. Hochberg, I. Fink & A. Denize, Quart. Bull. Sea View Hosp., July, 1946, 8: 205.*—(*P. Q. Edwards*)

Partial Claviculectomy.—Most cases of chronic empyema can be treated successfully by the use of multiple surgical procedures: extrapleural thoracoplasty, Schede thoracoplasty, pedicled muscle graft implantation with or without partial scapulectomy. By these measures the posterior empyemal spaces are obliterated, but in certain cases the space extends also anteriorly and laterally and is held open by the clavicle. Removal of the first rib and its underlying parietal pleura fails to effect collapse because the extrathoracic tissues are held out by the clavicle anteriorly. The clavicle tends to rotate posteriorly following removal of the first rib, and, in so doing, some elevation of the scapula occurs. However, the length of the bone prevents approximation of the shoulder girdle to the chest wall, and, if infection is present in the space between, healing will not take place. Similarly, in subscapular space infections following thoracoplasty either for pulmonary disease or for empyema, drainage may persist for a long period of time due to the failure of the subscapular space to obliterate. The author presents 3 cases, in all of whom the infected space has been markedly diminished in size. The procedure is simple. Following removal of the clavicle the shoulder girdle will rely for support upon the trapezius and rhomboid muscles. Should these not be intact, as in cases of posterior wound infection, there will not be sufficient support of the shoulder girdle to hold up the arms. Following removal of the clavicle there is an immediate descent of the shoulder and scapula with an approximation of the shoulder girdle to the chest wall. Motion in the arm is retained with full strength to the horizontal level of abduction. The clavicle regenerates at the site of its periosteal bed in an irregular form analogous to the appearance of regenerated rib. With the clavicle absent there is more deformity than there is when it is intact, the shoulder being appreciably lower and closer to the chest wall than it is on the normal side.—*Partial Claviculectomy as an Adjunct to Surgical Collapse of the Chest Wall, A. Lambert, J. Thoracic Surg., August, 1946, 15: 266.*—(*W. M. G. Jones*)

Oxidized Gauze in Thoracoplasties.—"Oxidized gauze" (soluble cellulose) is a valuable addition to the hemostatic armamentarium. It provides, in an easily handled form, a packing material which can be safely left in a wound with no fear of its remaining as an

irritating or permanent foreign substance. Its use in clean wounds does not delay healing, nor does it interfere with the strength of union of tissues. When soaked with blood it has no strength of fiber, but rapidly becomes a sticky mass which is admirably adapted to packing deep narrow cavities either in soft tissues or in relation to raw bony surfaces. Oxidized gauze was not used in infected wounds, nor on serous membranes. In wounds subjected to a powdering with sulfathiazole, its action is unhindered. The technique of thoracoplasty calls for formalinization of rib periosteum, but as the oxidized gauze is sterilized in formalin, no ill effect follows from use here. (Oxidized gauze is marketed by Parke, Davis & Co. under the trade name of "Oxycel," and by Johnson & Johnson under the name of "Hemo-Pak.")—*Report of a Clinical Trial of Oxidized Gauze in Seven Thoracoplasties, R. A. S. Cory, J. Thoracic Surg., August, 1946, 15: 261.*—(*W. M. G. Jones*)

Intracavitary Drainage.—This report covers the Edward Sanatorium experience for the years 1941–1944. "Intracavitary suction should never be used when any other form of treatment is applicable. It is indicated for quiescent cavities of relatively long standing which are not surrounded by 'soft' active disease in patients in whom low vital capacity precludes the use of other measures. It is also of value in reducing the size of extremely large excavations as a preliminary to thoracoplasty." To avoid the development of empyema the operation should be divided into two or three stages. At the first stage the pleura is explored through a small intercostal incision if the catheter is to be inserted from in front, or by resection of a small piece of rib, if the catheter is to be inserted from the back. If adhesions are found the wound is sutured, and the catheter inserted one or two weeks later. A small amount of lipiodol or a small metal clip is left at the level of the pleura for X-ray check on relation of site to the cavity. If a free pleura is encountered a small iodoform gauze pack with metal clip is left on the pleura for ten to fourteen days, at which time the presence of adhesions is verified. The wound is again sutured and one week later the catheter is inserted. The placing of the catheter requires extreme care. The cavity is located first by exploratory aspiration with a long 19-gauge needle, which can be assumed to be in the cavity when air or pus can be freely aspirated. The depth of the cavity is then noted and marked on the cannula which is the type used in draining the gall bladder and will admit a No. 14 French catheter. Trocar and cannula are inserted to determined depth and catheter put in a little deeper than the mark. After the cannula is removed, the catheter is pulled out a trifle, leaving 1 inch within the cavity. It is extremely important that the tube be fixed firmly in place by an air tight adhesive dressing and that great care is taken to keep it in place. Continuous suction is maintained for six to ten months through a trap bottle and Stedman electric pump. Then for a month the open catheter is left in place. If the cavity reopens suction is again applied; if it remains closed, the tube is removed. Results: of 29 patients, 13 are dead, but at autopsy, 3 of these had closed cavity. Of 16 living patients, 13 have closed cavity and 7 negative sputum; only 2 are worse. Twenty-two of the 29 patients had too extensive disease and too little vital capacity to permit any other form of treatment; 11 of these 22 are well or greatly improved. In 7 early cases the procedure was used in patients who might have been treated otherwise; 2 of these are well.—*Intracavitary (Monaldi) Suction, J. R. Head, J. Thoracic Surg., June, 1946, 15: 153.*—(*W. M. G. Jones*)

Congenital Tuberculosis.—When an infant dies in the first few weeks of tuberculosis, incompatible with postnatal infection because of extent, the diagnosis of congenital tuberculosis is warranted. In such cases, a primary lesion is found in the liver, with extensive involvement of the lymph nodes at the hepatic hilum. In rare cases, this primary complex is absent. Instead, extensive pulmonary changes are found. These

differ from the usual changes of postnatal tuberculosis in that no distinct primary focus is found. The lungs are peppered by small submiliary deposits. The hilar nodes are involved in a diffuse manner without topographical gradation. Seven such cases were reported up to 1939. The authors report the case of an infant who died on the seventeenth day of life. The mother was perfectly well. The deposits in the lungs were found to be bronchogenic in nature. The extensive cellular reaction about the lesions indicated an age greater than seventeen days. These lesions resembled those found in experimental animals infected intratracheally by tubercle bacilli. The conclusion is that this was a case of prenatal tuberculosis resulting from aspiration of infected amniotic fluid.—*Aspiration Type of Congenital Tuberculosis, W. Pagel & S. Hall, Tubercle,October, 1946, 27: 153.—(A. G. Cohen)*

Inoculation Tuberculosis.—A 25-year-old white Army officer received multiple superficial wounds of the face, in part from shell fragments and in part from splinters of wood. The fragments were excised and the wound healed without complication. About a month later a tender swelling appeared just lateral to the external canthus of the right eye, at a point where a fragment of wood had been excised. At the same time a tender swelling was noted below the right mandible. Under treatment with hot compresses, the facial lesion broke down and formed an ulcer. The ulcer and the lymph node were excised since they suggested a malignant lesion. The histological diagnosis was tuberculosis, acid-fast bacilli were demonstrated in both lesions. A tuberculin test was positive. The patient received X-ray and ultraviolet therapy. At a follow-up examination four months later the scars were well healed. In the area of the ulcer, however, there were two small lesions interpreted as active tuberculous lesions.—*Inoculation Tuberculosis, H. E. Bass, J. A. M. A., November 30, 1946, 132: 785.—(H. Abeles)*

Tuberculosis of Skin.—The primary tuberculous complex of the skin consists of a series of clinical events following the introduction (and multiplication) of tubercle bacilli into the skin. A small indolent inflammatory nodule or ulcer appears from one to three weeks after inoculation. Four to ten weeks later regional adenitis, with or without lymphangitis, follows. The adenitis is the most striking feature of the disease. As a rule the disease is comparatively benign and the process may heal within a few months. Less frequently the enlarged nodes undergo caseation necrosis and the process may extend to other groups of lymph nodes. Draining sinuses result. Generalized tuberculous infection including pulmonary disease sometimes follows. Theoretically a diagnosis of primary tuberculous complex of the skin is not acceptable unless it can be demonstrated that the patient did not have tuberculosis previous to the onset of his clinical lesions. Reinoculation tuberculosis of the skin may so closely simulate the primary skin complex as to be indistinguishable from it. It may be impossible to establish the diagnosis in adults, particularly in those of advanced age. The author reports the case of a 64-year-old woman who presented the clinical picture of the primary tuberculosis complex of the skin. She became inoculated with virulent tubercle bacilli when kissed by her husband who was dying of tuberculosis. The rapid appearance of the tuberculous lesion on the lower lip, followed within five or six weeks by cervical adenitis, and the subsequent involvement of other nodes on both sides of the neck with caseation fulfill the criteria for the primary tuberculous complex of the skin. The clinical course of the disease appeared benign until one year before death. Other chains of lymph nodes later became involved, and finally symptoms of pulmonary tuberculosis appeared. Inoculation of a guinea pig and bacteriological and histological studies of the affected tissues confirmed the tuberculous nature of the infection. Postmortem examination failed to show grossly the presence of healed tuberculosis. Nevertheless the case must be regarded as one of reinfection tuberculosis.—*Primary Tuberculous Complex of the Skin: Occurrence in a Woman Aged*

Sixty-four, N. N. Epstein, Arch. Dermat. & Syph., May, 1945, 51: 317.—(J. S. Woolley)

Classification of Tuberculosis of Skin.—Present day classifications tend to stress one or another of the following points: (*1*) mode of arrival of the bacillus at the site of the cutaneous lesion; (*2*) clinical features; (*3*) histological and bacteriological features; (*4*) immunological status; and (*5*) prognosis. The clinical features of the various forms of cutaneous tuberculosis afford the most important information, since it is impossible even to begin a classification unless the various tuberculodermata can be correctly recognized and given specific names. Even clinically one form of skin tuberculosis is sometimes indistinguishable from another yet, all in all, the clinical features of tuberculodermata are consistent, and from a practical standpoint this is important. Tuberculosis of the skin may be divided into two main groups: (*1*) the stable forms, as exemplified by *lupus vulgaris;* and (*2*) the labile, or transient forms, typified by the tuberculids. Bacteriological observations, except for rare types of cutaneous tuberculosis, are not a great help in forming a classification. Bacilli may be easily found only in primary cutaneous tuberculosis, the ulcerating orificial type and generalized miliary tuberculosis of the skin. Ascertaining the degree of allergy (tuberculin skin test) is essential in completing the study of a patient with tuberculosis of the skin. It must be borne in mind that an internal focus may be responsible for a positive test and not necessarily the cutaneous lesion. The most acceptable classification of tuberculosis of the skin is the one which enables the physician to make a prognosis. On this basis certain tuberculodermata may be grouped together, and if those in the same group are critically analyzed, common characteristics can be found which assist in classification. With this in mind the following classification of cutaneous tuberculosis is suggested:

A. Forms which are chronic and progressive, rarely terminating fatally
   - I. *Tuberculosis cutis luposa*
   - II. Tuberculosis in the American Negro (cause debatable)
   - III. Sarcoidosis (cause debatable)

B. Forms which tend to heal
   - I. Relatively rapidly
     - a. Primary cutaneous tuberculous complex
     - b. *Tuberculosis cutis verrucosa*
     - c. *Tuberculosis cutis lichenoides* (lichenoid papular tuberculid)
     - d. *Tuberculosis cutis papulonecrotica* (necrotic papular tuberculid)
   - II. More slowly
     - a. *Tuberculosis colliquativa* (scrofuloderma)
     - b. *Erythema induratum* (necrotic nodular tuberculid)
     - c. *Tuberculosis miliaris disseminata faciei* (lupoid papular tuberculid)

C. Forms which usually terminate fatally
   - I. *Tuberculosis cutis miliaris acuta generalisata*
   - II. *Tuberculosis cutis orificialis*

In tuberculosis of the skin, even though various appropriate names are evolved, it must be understood that there is a close similarity and relationship between types. A diagram is given which shows two basic forms: the stable or long lived, as exemplified by *lupus vulgaris*, and the labile, or shorter lived, as exemplified by the tuberculids, with their various merging ramifications.—*Classification of Tuberculosis of the Skin, H. E. Michelson & C. W. Laymon, Arch. Dermat. & Syph., August, 1945, 52: 108.*—(*J. S. Woolley*)

Primary Tuberculosis of Conjunctiva.—Primary tuberculosis of the conjunctiva is rare. Diagnosis is based on: (*1*) there is no other demonstrable tuberculous lesion elsewhere in the body; (*2*) the process is unilateral; and (*3*) there is involvement of the satellite, preauricular nodes and other regional nodes. In general, methods of inoculation on the conjunctiva are: (*1*) primary infection is exogenous by definition; (*2*) secondary infection may be exogenous (as by a finger touching the eye) or endogenous

(by the blood stream) or by direct extension (as in a lupus or from tuberculosis of the orbit). Five types of tuberculous lesions of the conjunctiva are listed: ulcerative, nodular, hypertrophic papillary, polypoid, tuberculoma. A case of primary tuberculosis of the conjunctiva of the ulcerative type is presented, which occurred in a 10-year-old white boy with no history of exposure to tuberculosis. He developed a small lump in front of the right ear and, two days later, another lump beneath the right angle of the jaw and, again two days later, a swelling in the right eye. Biopsy of the ulcer revealed granulation tissue containing typical tubercles with Langhans' giant cells. Special stains and cultures from the scrapings of the lesion revealed acid-fast bacilli. Roentgenological examinations of the chest and abdominal regions showed no abnormality. The Mantoux test (1:10,000 dilution of OT) was strongly positive.—*Primary Tuberculosis of the Conjunctiva, A. A. Goldfarb & I. Seltzer, Am. J. Dis. Child., August, 1946, 72: 211.*—(*O. Pinner*)

Tuberculomata of Liver.—The author describes a case of multiple tuberculomata (massive tuberculosis) of the liver in a man of 42, terminating with miliary tuberculosis. No primary tuberculous complex could be demonstrated but a calcified lymph node was found in the ileocecal region. It is possible that this old focus became active and that bacilli escaped into the portal vein and periportal lymphatics and so spread to the liver and spleen. Caseous nodes in the *porta hepatis* and along the splenic vessels support this view.—*A Case of Multiple Tuberculomata of the Liver, N. Ashton, J. Path. & Bact., January, 1946, 58: 95.*—(*H. J. Henderson*)

Tuberculosis of Tonsils.—Primary tuberculosis of the tonsils with a lymphatic component in the cervical nodes, usually just at the angle of the jaw, seems a fairly common occurrence. If the lesion in the tonsil is to be accepted as primary, it is essential that the patient have no pulmonary foci and show no evidence of calcification in the hilar nodes. Statistics show that when these criteria are applied, 48 out of a series of 98 children in whom tonsillectomy was performed, showed histological evidence of tuberculosis of the tonsils. Similar figures were obtained by other investigators. The rational treatment of tuberculous cervical lymphadenitis should always include tonsillectomy.—*Zur Frage der primären Mandeltuberkulose und zur Behandlung der Halsdrüsentuberkulose, E. Schlittler, Schweiz. med. Wchnschr., November 30, 1946, 76: 1235.*—(*H. Marcus*)

Lymph Node Tuberculosis.—Tuberculosis of the external lymph nodes is not a primary disease in the sense of an initial lesion. The disease should be treated locally and generally. The authors distinguish six different stages of lymph node tuberculosis: (*1*) benign lymphogranuloma; (*2*) caseo-purulent lymphoma; (*3*) lympho-fibro-granuloma; (*4*) fibro-lymphoma; (*5*) caseo-purulent lympho-fibro-granuloma; (*6*) calcified adenitis. Spontaneous healing may occur in any stage. Sanatorium care for children is important but there is no specific medication. Chemotherapy has not shown any advantages. Climate has no special influence. Heliotherapy acts by its bactericidal effect. The most important medical treatment is X-ray therapy. Its effect seems to be due to the destruction of the lymphocytes and resulting sclerosis of the lymph node tissue. Cold abscesses should be opened and treated with sulfanilamide. Total extirpation of a single caseous node is a good method but it should not be done in the beginning of the process, as there is risk of lymphatic and hematogenous spread. Under no circumstances should multiple masses be extirpated. Electrocoagulation under local anesthesia may be employed.—*Tratamiento de la tuberculosis ganglionar externa, O. A. Vaccarezza, An. Cáted. de pat. y clin. tuberc., June, 1945, 7: 157.*—(*W. Swienty*)

Bone Tuberculosis.—Systematic X-ray studies of the entire skeleton in 42 children

with primary tuberculosis revealed tuberculous foci in 40.5 per cent of cases. The X-ray changes which were considered as a basis for the diagnosis of tuberculous bone involvement were as follows: (*1*) Swelling of the soft tissues surrounding the diseased joint; (*2*) osteoporosis of the bones of the involved extremity; (*3*) more or less clearly outlined foci of bone rarefaction. Isolated foci showed in their earlier stages unsharp demarcation; they were roundish or oval, they were up to 0.5 cm. in diameter. In later stages these foci were clearly delineated, larger in size (up to 1.5 cm.). They were mostly located in the metaphysis or epiphysis of the long bones. The highest incidence was found in children with protracted primary tuberculosis. It is emphasized that definite osseous foci as demonstrated by X-ray films were clinically absolutely silent and often remained so during the further course. Most often a single bone focus was found. The majority of lesions was found in the proximity of the knee-joint, that is, in the lower epiphysis and metaphysis of the femur and the corresponding regions of the tibia. After routine discovery of such osseous foci close follow-up is recommended.—*Isolated Tuberculous Osseous Foci during the Phase of the Primary Complex in the Lung, J. P. Parfenova, Probl. tuberk., 1946, No. 1, 33.*—(*V. Leites*)

Tuberculous Arthritis.—Taken singly, the roentgen signs of tuberculous arthritis are not pathognomonic. But taken together and in sequence they are sufficiently reliable for an accurate diagnosis. Tuberculosis of a joint is a metastatic process and may be in the synovial membrane or the bone contiguous to it. Early diagnosis is usually precluded by the insidious onset and X-ray diagnosis lags behind clinical diagnosis. The life history of an active tuberculous arthritis is as follows; cortical erosion, osteoporosis, loss of joint space, invasion of underlying cancellous bone, involvement of the opposing surface of the joint, absence of reactive changes, formation of sequestra, accumulation of debris, rupture of the joint capsule with tracking of the fluid and debris resulting in cold abscesses and luxation of the joint. Some of these signs appear concurrently and increase in intensity with the increasing severity of the joint disease. No part of the joint is immune to a tuberculous infection and, if unchecked, will ravage every portion of it.—*Tuberculous Arthritis of the Shoulder, M. R. Camiel, Radiology, June, 1946, 46: 569.*—(*G. F. Mitchell*)

Surgery in Bone Tuberculosis.—Surgical interventions in osteo-articular tuberculosis are divided in (*1*) auxiliary, (*2*) radical, (*3*) correcting procedures. Auxiliary operations intend to create the most favorable conditions for the healing of the tuberculous lesion through operative fixation, without attacking the lesion itself (spinal fusion, arthrodesis). Radical operations, having the purpose of removing the tuberculous focus from the organism were employed predominantly in tuberculosis of the knee joint. The so-called "economical" resection was performed as a final act of conservative treatment. In addition to resection after opening the joint, a special technique of extraarticular resection is described. The correcting interventions, consisting mainly in osteotomy, are performed for improvement of abnormal positions which have developed as a result of the arrested tuberculous process. The liberal use of blood transfusions highly improved the results of the mentioned interventions reducing the postoperative mortality. One thousand nine hundred operations, performed over a period of twenty-five years, are reviewed. Surgical procedures were used in about 40 per cent of cases with osteo-articular tuberculosis. Radical operations of the prophylactic type of bone resection were performed only in 10 per cent of cases. Half of these were resections of periarticular osseous foci, the other half were in the diaphysis and especially in the calcaneus. Resections of the "economical" type were performed in 40 per cent of cases. The majority of these concerned the knee-joint. One hundred

fifty spinal fusions and 50 intraärticular arthrodeses of the hip joint were performed. In tuberculosis of the spine the immediate operative results were favorable in 88.8 per cent of cases, as compared with 64.7 per cent if conservative treatment alone was employed. The outcome was unfavorable in 2.9 per cent and 7.6 per cent died. In tuberculosis of the hip joint the immediate favorable results were 91.6 per cent as compared with 67 per cent with conservative treatment; 3.1 per cent were unfavorably influenced and 4.6 per cent died. The mortality was 10.8 per cent with conservative treatment. In tuberculosis of the knee joint surgical treatment produced 98 per cent favorable results, conservative treatment 72 per cent. The mortality was 1.1 per cent with surgery, 6.7 per cent with conservative treatment. The remote favorable results in tuberculosis of the spine, the hip joint and of the knee were 74.5 per cent, 85 per cent and 95 per cent, respectively.—*Remote Results of Surgery in Osteo-articular Tuberculosis, P. G. Kornev, Probl. tuberk., 1945, No. 5, 15.*—(*V. Leites*)

Tuberculosis of Uterus.—Two forms of tuberculosis of the uterus are recognized, caseous exudative endometritis and disseminated productive disease which involves the endometrium and the muscular layers. When seen at an early state, the two forms can be well differentiated. Caseous endometritis is somewhat more common and always originates by extension of a tuberculous caseous process from the Fallopian tube. It is often combined with tuberculous peritontis and also with other evidence of protracted dissemination. The prognosis is usually poor, in so far as the function of the generative tract is concerned. Disseminated uterine tuberculosis shows small productive foci in the myometrium and in the endometrium. There is little tendency to caseation and local spread, with rupture of a focus into the uterine cavity. Such foci may remain indolent and unchanged for years. They are usually not discovered, unless specimens obtained from curettage are examined systematically for this condition. Often only histological examination at autopsy gives evidence of this form of uterine tuberculosis. When the diagnosis is made by scraping, it is important to differentiate the two conditions because of the difference in prognosis. Primary exogenous infection of the genitalia has been claimed, but no convincing case has been published. There is no tendency for a local tuberculous lesion of the perineum to ascend and thus produce tuberculosis of the uterus and tubes.—*Die Pathogenese der Uterustuberkulose, W. Berblinger, Schweiz. med. Wchnschr., November 30, 1946, 76: 1223.*—(*H. Marcus*)

Genito-urinary Tuberculosis.—At Fitzsimons General Hospital, the ratio of admissions for pulmonary to genito-urinary tuberculosis was 33 to 1. There was a high incidence among Negro and American Indian troops. There was no previous history of tuberculosis. Cases of tuberculosis of the kidneys or epididymis comprised almost the entire series. Only 20 per cent of the cases showed active or inactive pulmonary tuberculosis. There was a greater incidence of pulmonary tuberculosis with renal than with epididymis involvement. Other forms of extrapulmonary tuberculosis were not common; of these, involvement of the bones and joints was most frequent. Most of the renal cases were early. They were usually detected in the course of evaluation of pyuria. The most frequent symptoms were mild discomfort in the back and fever. A few patients had bladder symptoms. In many, pyelography was inconclusive. Retrograde pyelograms usually yielded better information than the intravenous. Great reliance was placed upon cultures of the urine for tubercle bacilli. Cultures were more accurate than smears. Guinea pig inoculations were not done. Bilateral cases were rare. Nephrectomy was the treatment of choice unless cultures showed involvement of the other kidney. However, if the involved kidney was badly diseased while the other kidney was only slightly involved, then nephrectomy was

done anyway. Operation was not done if there was pulmonary tuberculosis unless this was quiescent. There were no operative deaths. In tuberculous epididymitis, the lesion was bilateral in 28 per cent. Renal tuberculosis was present in 30 per cent and pulmonary tuberculosis in 13 per cent of the cases. The first symptom was painful swelling in the scrotum. This was gradual in onset. The whole epididymis was greatly enlarged, hard, nodular and irregular, but not extremely tender. It was often adherent to the scrotum with or without sinus formation. In a few cases, the testis was involved. The vas deferens was involved in most, and also frequently the prostate and homolateral seminal vesicle. Epididymectomy was the treatment of choice.—*Tuberculosis of the Genitourinary Tract among Soldiers in World War II, R. Chute, New England J. Med., October 17, 1946, 235: 586.*—(*A. G. Cohen*)

Genito-urinary Tuberculosis.—Tuberculosis of the kidney, both in the male and in the female, is undoubtedly due to hematogenous dissemination of the disease. No convincing case of ascending renal tuberculosis from genital tuberculosis in the male has been reported to date. In the male, the majority of cases of genital tuberculosis originate in the prostate. The spread to the prostate occurs by way of the blood-stream. The seminal vesicles are also infected by the blood-stream, but tuberculosis of the ductus deferens and the epididymis occurs by intracanalicular spread. In a small proportion of cases the prostate appears to become infected by infected urine from tuberculous kidneys. This is undoubtedly an infrequent occurrence. In 35 carefully studied cases the possibility of this form of pathogenesis was considered in 5. In the female, tuberculosis of the tubes is apparently more often caused by extension from a tuberculous process in the peritoneum. Spread of the process throughout the tubes and the uterus occurs by direct extension. Hematogenous tuberculosis of the tubes and the uterus probably occurs too, but it is rare. In such cases the wall of the tube may contain a tuberculous focus which eventually breaks into the tubal lumen. It is more usual that one is able to demonstrate extensive caseous changes in the mucous membrane lining the tube without definite changes in the muscular coat. In 35 cases, peritoneal tuberculous foci could be demonstrated 27 times in the vicinity of the tubal opening. Aside from the 70 cases mentioned above, the material for this study included two series of post-mortem material. Among 933 autopsies of pulmonary tuberculosis, 102 cases of genito-urinary tuberculosis were found, in another series of 445 cases, renal tuberculosis was found 82 times, or in 18.4 per cent.—*Die Urogenitaltuberkulose, W. Berblinger, Schweiz. med. Wchnschr., November 16, 1946, 76: 1171.*—(*H. Marcus*)

Tuberculous Abscess following Penicillin.—The patient received a continous intramuscular drip of penicillin in the thigh for about twenty-four hours. Four months later, he developed a fluctuant swelling at the site of the infusion. Upon incision, pus was found which, on study, revealed tubercle bacilli. Thorough investigation of the patient revealed no tuberculous foci in the lungs, spine or elsewhere. It is thought that tubercle bacilli were probably introduced through the infusion needle.—*Tuberculous Abscess following Intramuscular Penicillin, D. Ebrill & S. D. Elek, Lancet, September 11, 1946, 2: 378.*—(*A. G. Cohen*)

Changing Virulence.—The Gué strain of bovine bacilli, having been maintained on bile-potato media for several years, has partially lost its virulence. Two experiments were carried out with this strain to demonstrate altered virulence in successive guinea pig passages. In the first of this series, guinea pig A was inoculated with 0.1 mg. of bacilli of very attenuated virulence from a bile culture of 125 passages. From this animal a biopsied inguinal lymph node was implanted into pig B. Following four similar successive passages from pig to pig, the bacilli had not shown any return to virulence

in spite of their very long survival. On the other hand, following the death of pig A a caseous lumbar lymph node was inoculated into two successive guinea pigs, following the second such passage the bacilli developed a rapid return to normal virulence. The second experiment consisted of inoculating guinea pig C with 1.0 mg. of strain Gué after 134 bile passages. The pig died slowly of extensive tuberculous lesions. During the third month of its illness an inguinal lymph node was biopsied and inoculated into pig D. This node proved to be totally innocuous although a marked tuberculin allergy developed in pig D. When pig D died, of other causes than tuberculosis, one year after inoculation, the organs showed no trace of tuberculous lesions, but cultures from the macerated organs produced bacilli more virulent for guinea pigs than the original 134th passage Gué culture. There are two possible explanations for this alteration in virulence after successive animal passages: (*1*) possible dissociation of the virulent elements in the course of the disease. Nodes biopsied early in the disease prove to be less virulent than nodes removed at the time of the death of the animal. (*2*) There may be a gradual liberation of the already attenuated bacilli from the transplanted node, so that the host develops some immunity.—*Variabilité de la virulence d'une souche de bacilles tuberculeux bilié au cours de l'infection chez le cobaye, F. van Deinse, Ann. Inst. Pasteur, July–August, 1946, 72: 567.*—(*P. Q. Edwards*)

Respiration of Tubercle Bacilli.—Respiratory metabolism of several types of paratubercle bacilli was studied in an attempt to determine if group specificity could be established. Bacilli employed in the studies were: strain D6 from the intestine of an infant, B1 from a mesenteric node of an ox, Pellegrini's bacillus and *Bacillus C* from spinal fluid of a child. The respiratory activity of a given culture was found to be a function not only of the age of the bacilli but also of the alteration of the medium occasioned by bacillary mortality. All growth phases of a culture of bacilli, including the phase when no death takes place, are accompanied by a more and more pronounced lowering of the respiration varying directly with the unit of bacilli present as well as the inevitable alteration of the milieu. Thus a means of determining the death rate of a given culture is established through measurement of its respiratory retardation. The paratubercle bacilli studied have certain physiological properties in common, including similarities in their respiration.—*Contribution à l'étude du métabolisme des bacilles paratuberculeux: II. Métabolisme respiratoire de divers types des bacilles paratuberculeux, A. Andrejew, Ann. Inst. Pasteur, July–August, 1946, 72: 611.*—(*P. Q. Edwards*)

Metabolism of Tubercle Bacilli.—Experiments concerning the respiration and growth of tubercle bacilli demonstrated that these two functions are largely independent. Certain substances augment the respiration of tubercle bacilli and at the same time increase their growth and multiplication; certain substances increase the respiration without affecting growth; other substances, while increasing the respiratory processes, depress or abolish multiplication. A substance of the latter order is sodium salicylate. Five different groups of substances are evaluated with respect to their capacity for affecting the respiration and growth of tubercle bacilli. The substances tested were primary amines and their derivatives, heavy metal compounds, sulfonamides, disinfectants and fatty acids. Results show that three different effects on tubercle bacilli were obtained. Heavy metal compounds, disinfectants and fatty acids produced their effects by irreversible damage to the bacterial cell. The respiration of the cell body was also severely damaged by these substances. The sulfonamides produced bacteriostasis of a nonspecific and reversible nature. In the presence of suitable antagonistic substances (p-aminobenzoic acid) the effect could be completely annulled. The effect of the sulfonamides on tubercle bacilli is no different from that produced on other

microörganisms. Cell respiration and the ability of the single cell to grow remains unimpaired, but division of cells, mitosis and multiplication are stopped. Of special importance is the action of the primary amines. These produced specific reversible effects on the multiplication of tubercle bacilli, without affecting respiration and growth. These substances had no effect on other microorganisms, but their effectiveness was from six to eighty times that of a 0.0002 molar solution of sodium salicylate.—*Über den Stoffwechsel von Tuberkelbazillen, H. Bloch, Schweiz. med. Wchnschr., November 16, 1946, 76: 1179.*—(*H. Marcus*)

Fatty Acids and Bacterial Growth.—Unsaturated fatty acids retard the growth of tubercle bacilli, but these acids can be detoxified by their esterification or by the addition of native serum albumin to the medium. Enhancement of growth of tubercle bacilli can be obtained by adding 0.01 per cent of any of a variety of long chain fatty acids—saturated or unsaturated—to a medium containing 0.5 per cent crystalline serum albumin. Glucose is not necessary. The growth of *Micrococcus C* is increased in proportion to the amount of unsaturated fatty acids in the medium, and glucose further increases it. The saturated fatty acids do not support growth of *Micrococcus C*, and crystalline albumin inhibits the growth. At equal concentrations of long chain fatty acids, the water soluble esters are more efficient than the corresponding soaps in supporting bacterial growth.—*Effect of Long Chain Fatty Acids in Bacterial Growth, R. J. Dubos, Proc. Soc. Exper. Biol. & Med., October, 1946, 63: 56.*—(*F. B. Seibert*)

Fatty Material in Bacteria and Fungi.—An improved technique for demonstrating intracellular lipid in microörganisms by staining dried, fixed preparations with Sudan black B, and counterstains is described. The application of this staining method to films of the principal species cultivated on common media revealed that stainable fatty material in the form of cytoplasmic inclusions, or such material associated with structural elements of the cells, is present in all fungi and in the great majority of bacteria, whether these are aerobic or anaerobic, saprophytic or parasitic, pathogenic or nonpathogenic. Of greatest interest was the unexpected finding that the relative amount of stainable fatty material and its form and location within the cells of bacteria are remarkably constant for any one kind of organism. Definite differences occur among different kinds. Thus, the pattern of intracellular lipid exhibited in the stained films is to a considerable degree characteristic for the bacteria of a particular genus, and in some cases for those of a particular species.—*Fatty Material in Bacteria and Fungi Revealed by Staining Dried, Fixed Slide Preparations, K. L. Burdon, J. Bact., December, 1946, 52: 665.*—(*F. G. Petrik*)

Disparity between Hansen's Bacilli and Cultured "Leprosy Bacilli."—By application of the writer's improved fat-staining procedure (Sudan black B) for dried preparations it was found that the principal varieties of acid-fast bacilli in culture show an essentially similar picture with respect to their stainable intracellular lipid. Characteristic of the whole group is the tendency of the cells to stain throughout with Sudan black B; in addition, distinct deeply colored fat droplets may be present within many of the rods. Some differences were noted in the amount of fatty material usually present, and in the regularity with which it occurred, in different varieties of these organisms. The constancy and prominence with which stainable lipid occurs in cultured "leprosy bacilli" was repeatedly confirmed, and their marked similarity in this respect to the tubercle bacilli of the "cold-blooded type," and to the frankly saprophytic acid-fast organisms, was made clear by numerous comparative tests. A modified stain was applied to direct films from leprous lesions and the results were entirely consistent, that is, no intracellular stainable fatty material was observed in any

of Hansen's bacilli. The apparent total lack of stainable lipid in the true causative bacilli of leprosy is, at least, in striking contrast to the abundance of this material in the acid-fast bacilli isolated from leprous lesions and now maintained in laboratory cultures. The full significance of this disparity is debatable, but it would seem justifiable to count it as adding a further bit of evidence in support of the already widely held opinion that the organisms in these cultures are not identical with the true causative agent of leprosy.—*Disparity in Appearance of True Hansen's Bacilli and Cultured "Leprosy Bacilli" when Stained for Fat, K. L. Burdon, J. Bact., December, 1946, 52: 679.*—(*F. G. Petrik*)

Bovine Type Bacilli.—A culture of tubercle bacilli originating from a case of pulmonary tuberculosis in man was obtained in 1933 by injecting acetone extract of bacilli into guinea pigs. Shortly after its isolation this culture appeared to be avirulent for the rabbit and normally virulent for the guinea pig. After having been maintained for more than a year on potato medium, this culture acquired a very marked virulence for the rabbit. Six years after its isolation the virulence for the rabbit began to diminish. The virulence for the guinea pig started to decrease during the eighth year after isolation. The culture was considered to be of the human type, but endowed with an exceptional pathogenicity for the rabbit. The colonies were eugonic and of the R type. Simultaneously with the above experiments the culture was grown on bile-potato medium since 1934, which produced a more marked and a more rapid decrease in its virulence than on simple potato medium. After the 125th transfer, serial passages were made from guinea pig to guinea pig. The culture regained a marked virulence for the rabbit and the guinea pig. It appeared now as a S type; its growth was dysgonic and it exhibited all the characteristics of a bovine culture. The conclusion is drawn that the original strain was actually of the bovine type.—*Une souche de bacilles tuberculeux de type bovin difficile a classifier, F. van Deinse, Ann. Inst. Pasteur, March-April, 1946, 72: 241.*—(*V. Leites*)

False Acid-fast Bacilli.—Sudden increase in the number of acid-fast bacilli on smears from the chest wound (operative) of a tuberculous patient raised the question of false acid-fastness, in so far as the wound had been treated with sulfathiazole ointment prior to the noteworthy increase in bacilli. Several days after discontinuance of the ointment, the acid-fast bacilli present on smears decreased appreciably. Experimental *in vitro* reduplication of the phenomenon proved that diphtheroids, as well as *B. megatherium* and *B. coli*, are capable of being so coated with hydrous lanolin or petrolatum that they become acid-fast. This artefact may be eliminated by soaking fixed unstained smears successively in chloroform, ether and alcohol.—*False Acid-fast Bacilli, A. Berczeller & Grace Frank, Quart. Bull. Sea View Hosp., July, 1946, 8: 187.*—(*P. Q. Edwards*)

Dissociation of Tubercle Bacilli.—A guinea pig was inoculated through the mediastinal route with 2 mg. of a virulent bovine culture, presenting dysgonic growth on Löwenstein's medium. The animal died ten days later. Twelve cc. of a cloudy hemorrhagic fluid was found in the pleural cavities. Inoculation of this fluid on Laporte medium (egg-serum) produced smooth confluent colonies. One-half of the pleural fluid was diluted with citrate solution, the other half was permitted to coagulate. Both specimens were incubated at 38°C. Serial cultures made from these specimens remained negative until the thirty-fifth day at which time large conglomerations of typical acid-fast bacilli were found. On the fourty-sixth day real colonies were visible macroscopically in the citrate specimen. In the eighth month after incubation 1.0 cc. of the citrate specimen was injected into a guinea pig which died of tuberculosis four months later. After a stay of one year in the incubator the coagulum became useless because of desiccation. At this time the

bacilli in the citrate specimen were found in a state of lysis. Their inoculation in the guinea pig produced generalized tuberculosis of a chronic type and predominantly lymphatic involvement. Death occurred seven months later. Inoculation of the organs of the animal on Löwenstein's medium gave rise to eugonic colonies of the R type, whereas the original bovine strain had been of the S type and dysgonic. The colonies were of normal virulence for the guinea pig and of diminished virulence for the rabbit. Inoculation of the same one-year-old fluid on Laporte medium and Besredka medium produced smooth dysgonic colonies. This culture appeared to be avirulent for guinea pigs and rabbits. Thus three different dissociates could be isolated in these experiments.—*Dissociation d'une souche de bacilles tuberculeux virulents de type bovin dysgonique en une variante avirulente également dysgonique et une variante virulente eugonique après séjour prolongé dans un liquide pleural de cobaye, F. van Deinse, Ann. Inst. Pasteur, May–June, 1946, 72: 424.*—(*V. Leites*)

Surface-Active Substances and Tubercle Bacilli.—The authors reported on the influence of fourteen surface-active compounds giving surface tensions in the range 50-24 dynes/cm. in a synthetic liquid medium upon the growth of three strains of acid-fast bacteria. The growth of *Mycobacterium tuberculosis*, human type, and *Mycobacterium phlei* was inhibited only at surface tensions below about 30 dynes/cm. The chemical nature of the depressant used did not appear to be a relevant factor. The medium containing depressants showed an increase in surface tension during growth, tending to the value of the unheated medium, showing that these compounds were adsorbed by the bacteria.—*The Influence of Surface-Active Substances on the Growth of Acid-fast Bacteria, A. E. Alexander & N. A. Soltya, J. Path. & Bact., January, 1946, 58: 37.*—(*H. J. Henderson*)

Preservation of Tubercle Bacilli.—The object of this experiment was to ascertain the extent of resistance of *M. tuberculosis* (human and bovine types) to (*a*) freeze-drying and (*b*) storage at −76° C. Suspensions containing 1 mg. per 1 ml. were made in distilled water, physiological saline solution and in inactivated bovine serum, respectively. These suspensions were subjected to freeze-drying and to storage at −76° C. over a period of 180 days at seven-day intervals. An ampoule was diluted in serial dilutions ranging from $1:10^4$ to $1:10^8$ and inoculated into both guinea pigs and hamsters. The results of the biological test were checked by culturing the suspensions. Suspensions stored at low temperature showed no appreciable loss after 180 days. Freeze-dried material sustained an immediate fall in activity, estimated at 100 to 1,000 fold; thereafter the dried material remained stable. Bacterial suspensions preserved at −76° C. can be used with advantage in experiments where it is necessary to inoculate small numbers of living bacilli and to obtain reproducible results.—*The Effects of* (*a*) *Freeze-Drying and* (*b*) *Low Temperature on the Viability of Mycobacterium Tuberculosis, R. E. Glover, J. Path. & Bact., January, 1946, 58: 3.*—(*H. J. Henderson*)

Submerged Growth of Tubercle Bacilli.—The new synthetic media of Dubos for the rapid cultivation of Mycobacteria can be successfully employed to isolate tubercle bacilli from various pathological material. A combination of rapid culture with guinea pig inoculation where indicated should result in a marked reduction of the time required for the laboratory diagnosis of tuberculosis.—*Submerged Growth of Tubercle Bacilli from Pathologic Material in Dubos' Medium, G. E. Foley, Proc. Soc. Exper. Biol. & Med., June, 1946, 62: 298.*—(*F. B. Seibert*)

Tubercle Bacilli in Bronchoscopic Aspirations.—Bronchoscopic aspiration of secretions is recommended as a method of improving bacteriological diagnosis. The importance of penetrating as deeply as possible into the lobar bronchi, especially of the upper lobes, is emphasized. With this method the authors have

succeeded in demonstrating the presence of tubercle bacilli four times out of five in cases of small pulmonary infiltrations which had been negative on repeated examinations including gastric lavage.—*Les prélèvements bronchiques dans la recherche du bacille de Koch, M. Bariéty & J. Paillas, Rev. de la tuberc., 1944–45, 9: 337.*—(*V. Leites*)

Culture of Tubercle Bacilli.—Various methods for destroying contaminants are discussed. Search was made for a pure, stable, crystalline material which would allow time for preparation of the specimen and which might even be added to the specimen immediately on collection. Trisodium phosphate was the agent finally selected, in preference to several reagents, including oxalic acid and sodium hydroxide. Trisodium phosphate was used in 10 per cent solution, and it was found that it could remain in contact with tubercle bacilli up to a week at room temperature without destroying small numbers of tubercle bacilli. It was found that this reagent could be placed in receptacles for use in collecting tuberculous specimens and thus prevent the development of molds and contaminants. It was found that the time required for destroying contaminants by trisodium phosphate is one day at 37° C.—*An Improved Procedure for the Diagnostic Culture of Mammalian Tubercle Bacilli, H. J. Corper & R. E. Stoner, J. Lab. & Clin. Med., December, 1946, 31: 1364.*—(*R. W. Clarke*)

Growth Stimulation of Tubercle Bacilli.—The growth of mycobacteria on four kinds of egg media was observed: Dorset's (whole egg), egg-yolk, egg-white and a "defatted" yolk medium. A constant amount of inoculum was added to each of the media. Growth was observed from four to seventy days after inoculation. The amount of growth was determined by comparison with the growth on whole egg medium. Saprophytic acid-fast bacteria and those mycobacteria which are pathogenic for cold-blooded animals (excepting *M. marinum* Aronson and *M. tuberculosis*, Cayman strain) grew moderately well on egg-white but did not attain the standard of growth characteristic of whole egg medium. *M phlei* and *M. ranae* also grew moderately well on the "defatted" yolk medium. Avian, bovine and human tubercle bacilli exhibited no growth on egg-white and "defatted" yolk media at a time when luxuriant growth had been obtained on whole egg medium. All the organisms grew faster on the yolk medium. *M. tuberculosis hominis* (H37) produced scant growth on egg-white medium after ten weeks' incubation. The addition of purified ovolecithin and of ether soluble yolk lipids to egg-white medium stimulated the growth of *M. phlei, M. smegmatis, M. stercosis, M. karlinski, M. ranae, M. marinum, M. tuberculosis*, (Cayman strain) *M. tuberculosis hominis* (T_1), and *M. avium* (T_2). The addition of sodium citrate, asparagine, calcium, iron, dl-alanine, creatine, phthiocol, choline, ethanolamine, sodium palmitate, sodium stearate, sodium oleate, sodium glycerophosphate, ascorbic acid, nicotinamide, pyridoxin, pantothenic acid, riboflavin, dl-lactate and cytochrome to egg-white medium failed to stimulate the growth of tubercle bacilli. A crude phosphatide fraction of egg-yolk stimulates the growth of tubercle bacilli.—*Stimulation of the Growth of Egg Yolk, Margaret K. Finlayson, J. Path. & Bact., January, 1946, 58: 88.*—(*H. J. Henderson*)

Diagnostic Culture of Tubercle Bacilli.—The reagents commonly used for destroying contaminants are sodium hydroxide, sulfuric, hydrochloric and oxalic acid. These reagents are harmful to small numbers of tubercle bacilli even after two hours' exposure. A 10 per cent solution of chemically pure trisodium phosphate (equivalent to 23 per cent of $Na_3PO4 \cdot 12H_20$) added to fine suspensions of mammalian tubercle bacilli proved not only innocuous to the bacilli but was more protective than suspension of the bacilli in 0.9 per cent saline solution for long periods. This reagent destroys contaminants in one day at 37° C. or within several days at room temperature. It can remain in contact with tubercle bacilli for up to a week at room temperature

without destroying small numbers of tubercle bacilli. One week's exposure at 37° C. was not particularly detrimental to the viability of the tubercle bacilli, although the longer interval of one week's contact retards their growth. It was noted that either neutralization or washing out the phosphate produces more satisfactory results when compared with their planting in the phosphate as such. Glycerol egg-yolk medium when properly prepared proved the most efficient medium.—*An Improved Procedure for the Diagnostic Culture of Mammalian Tubercle Bacilli, H. J. Corper & R. E. Stoner, J. Lab. & Clin. Med., December, 1946, 31: 1364.*—(*F. G. Petrik*)

Vole Tubercle Bacilli.—It has been shown previously that vole tubercle bacilli are only slightly pathogenic for rabbits and guinea pigs. Injection of caseous material from lesions of naturally infected voles or of living vole tubercle bacilli protects these animals against virulent mammalian tubercle bacilli. Pathogenicity of the vole organism for calves is low. Its immunizing power is greater than BCG. All calves develop strongly positive tuberculin reactions. In the current study, 16 patients with far advanced tuberculosis were injected intracutaneously with 0.0001 mg. of a culture of living vole tubercle bacilli. A marked local reaction developed consisting of a tiny red papule surrounded by an area of erythema. This slowly increased in size, reaching its maximum size in ten days. In most, the papule became a pustule. There was no lymphadenopathy or constitutional reaction. The intensity of the reaction paralleled the Mantoux reaction. In other cases, the bacilli used were killed by heat; the reaction was slightly less intense but of the same character. When dosages up to 0.1 mg. were used, the same reactions were obtained but with intensity in proportion to the dosage scale. In no case was a patient affected adversely.—*The Intracutaneous Injection of Vole Tubercle Bacilli in Tuberculous Persons, C. Cameron & I. A. Purdie, Tubercle, December, 1946, 27: 195.*—(*A. G. Cohen*)

Codliver Oil in Tuberculosis.—Codliver oil administered intravenously at a rate of 3 cc. per kg. of weight causes no embolism. Two dogs of the same age and weight, one of which received an intravenous injection of virulent tubercle bacilli at the outset of the study, were treated with intravenous injections of codliver oil at the above rate for two months. Both animals survived, but the noninfected one weighed 1.5 kg. more than the one that was infected. Two goats were inoculated with virulent tubercle bacilli and one of them was treated with codliver oil injections in the above manner. Both animals were infected, but only one was treated. The nontreated goat died forty days after the injection, while the animal that was treated lived twenty days longer. No general conclusions can be drawn from these preliminary experiments; it appears, however, that codliver oil used in experimental tuberculosis increases the resistance to infection and diminishes the virulence of the bacilli.—*Ensayo de tratamiento de la tuberculosis experimental con aceite de higado de bacalao endovenoso, S. Gutman, Prensa méd. argent., August, 1946, 33: 1641.*—(*L. Molnar*)

Tuberculosis in Hamster.—A series of experiments was undertaken to determine the smallest dose of virulent human and bovine bacilli capable of infecting the hamster and to compare the susceptibility of this species with that of the guinea pig. Suspensions of seven to ten-day-old cultures, grown on Herrold's glycerol egg agar were inoculated subcutaneously. Serial dilutions ranging from 1: 10,000 mg. to 1:100,000,000 were used. The golden hamster is as susceptible as the guinea pig to the subcutaneous inoculation of the human and bovine types of *M. tuberculosis*. In each species the minimal infective dose of a fully virulent bovine strain is $1:10^7$ mg. bacilli; the corresponding dose of the human type is $1:10^6$ mg. In the hamster, caseous lesions are not common. A proliferative adenitis in which the nodes were teeming with acid-fast bacilli was noted.—*Susceptibility of the Golden Hamster (Cricetus Auratus) to Mycobacterium*

Tuberculosis Hominis and Bovis, R. E. Glover, J. Path. & Bact., January, 1946, 58: 107.—(H. J. Henderson)

Tuberculous Necrosis.—Necrotic tuberculous lesions were examined histologically, bacteriologically and biochemically. Numerous references to the literature on tuberculous necrosis and caseation are given. The authors do not believe that the fats contained in foci of caseous necrosis are due to sources outside the lesion or to fatty infiltration. Tuberculous necrosis is considered a tissue disintegration. Its biochemical constituents result from the transformation of normal tissue elements. No correlation could be found between the extent of necrosis and the quantity of demonstrable bacilli. More bacilli were found in foci of "incomplete" necrosis containing nuclear debris than in "complete necrosis." Foci of liquefied necrosis were always extremely rich in bacilli, apparently indicating a parallelism between bacillary content and content in leucocytes. It is the opinion of the authors that necrosis develops only in exudative lesions. Whenever productive foci show necrotic transformation these foci are assumed to have been the site of an associated exudative reaction. Tubercle bacilli are not believed to cause necrosis by direct fermentative action. Their rôle is rather seen in an indirect catalytic effect. No fundamental differences could be demonstrated between foci of dry and liquefied necrosis regarding the nature and the quantity of the fatty substances which they contain. The softening of a tuberculous lesion is attributed to phenomena occurring in the surrounding tissue, in particular to the state of perifocal circulation. Aqueous inbibition of the necrotic area is the result of exudation from perifocal vessels with migration of leucocytes. The marked increase in bacillary content during the stage of liquefaction is considered secondary to these "unspecific" processes of perifocal exudation.—*Signification biologique des divers aspects de la necrose tuberculeuse, F. Besançon & J. Delarue, Rev. de la tuberc., 1946, 10: 9.—(V. Leites)*

Persistence of Tuberculin Sensitivity.—Negative tuberculin reactions in persons with calcified foci in the lung or tracheobronchial lymph nodes might be due to obsolete tuberculous residues which no longer elicit hypersensitivity, or the calcified areas may have resulted from nontuberculous origins such as coccidioidomycosis, histoplasmosis etc. To determine what percentage of cases with tuberculin hypersensitivity become anergic Hardy studied 312 persons who had a primary tuberculosis during childhood. She found that of 59 persons who had the more severe types of lesion, none became anergic more than fourteen years after their primary infection. Of 171 persons with mediastinal tuberculosis, whose hypersensitivity was less marked than that of the first group, 2 per cent became anergic to 1 mg. of tuberculin. Of 82 persons who reacted to tuberculin but who had no demonstrable X-ray evidence of tuberculosis at the beginning of the study, 6 per cent became anergic. These persons were not in contact with sputum positive cases and only one developed reinfection tuberculosis after the healing of the primary lesion. From these data the author concludes that, though tuberculosis may be the etiological factor of calcified lesions which are not accompanied by hypersensitivity to 1.0 mg. of tuberculin, this occurs but rarely. Hence most of the calcified lesions unaccompanied by hypersensitivity are probably of a nontuberculous nature.—*Persistence of Hypersensitivity to Old Tuberculin following Primary Tuberculosis in Childhood, Janet B. Hardy, Am. J. Pub. Health, December, 1946, 36: 1417.—(M. B. Lurie)*

Cellular Transfer of Tuberculin Reactivity.—Guinea pigs were rendered hypersensitive to tuberculin by subcutaneous injection of killed human tubercle bacilli suspended in paraffin oil. Between five and nine weeks later, exudate cells were collected and washed and immediately injected into guinea pigs. In about forty-eight hours tuberculin hypersensitiveness became established in the cell recipients and maximal reactivity occurred in seventy-two to ninety-six hours. Of 17 experiments

successful transfer of hypersensitivity occurred in 16 instances. The intensity of the transferred hypersensitiveness varied with the amount of cells used and the degree of sensitivity of the cell donors. The cells become inactive upon being heated at 48° C. for fifteen minutes or upon freezing or storing overnight in the ice-box. Cells from the spleen or lymph nodes, as well as exudate cells from the peritoneal cavity, are capable of transferring hypersensitiveness to Old Tuberculin.—*The Cellular Transfer of Cutaneous Hypersensitivity to Tuberculin, M. W. Chase, Proc. Soc. Exper. Biol. & Med., June, 1945, 59: 134.*—(*F. B. Seibert*)

Accelerated Sensitization.—In 83 girls aged 14 to 21, tuberculin tests, performed nine days after the administration of BCG, remained completely negative except in 3 who had been previously doubtful. Almost all became positive before another ten weeks. Although there is no evidence that any of these girls had ever been actually infected and later spontaneously desensitized, the authors conclude that the absence of accelerated sensitization following infection in the human cannot be accepted as proof that the subject has never been previously infected.—*Le phenomène de Baldwin-Gardner-Willis chez le cobaye et chez l'homme, P. Boulenger & A.-C. Maclouf, Rev. de pathol. comp. et d'hygiène gen., January–February, 1944, p. 37.*—(*E. Bogen*)

BCG Vaccination.—BCG vaccination by means of the multiple puncture technique is asserted to have been entirely innocuous both locally and generally in animals studied over a period of ten years and in infants studied over a period of seven years. In 1,302 vaccinated children there were 4 cases of tuberculosis and one death from the disease, while in 1,276 controls there were 27 cases of tuberculosis and 7 deaths. The greater danger for children exposed to tuberculosis than in those where no contact is known is seen in both vaccinated and controls. It is concluded that in the first seven years of life BCG vaccination is of definite value in the prevention of tuberculosis.—*Ten Years Experience with BCG (Experimental and Clinical), S. R. Rosenthal, Margery Blahd & Eleanor I. Leslie, J. Pediat., May, 1945, 26: 470.*—(*E. Bogen*)

BCG Vaccination.—Administration of BCG by means of multiple scratches through the vaccine deposited on the skin resulted in 95.5 per cent positive tuberculin reactions in 89 girls tested within the next ten weeks. Sensitization developed earlier and stronger when the total length of the scratches was greater than 12 cm. than when it was less than 7 cm.—*Le BCG par scarifications cutanées, A. Courcoux, P. Boulenger & A.-C. Maclouf, Rev. de pathol. comp. et d'hygiène gen., September–October & November–December, 1944, p. 89.*—(*E. Bogen*)

Local Reactions to BCG.—The local reactions to BCG applied by intracutaneous injection or by scarification in the new-born and in tuberculin-negative persons consist in the appearance of very small nodules eight to twenty-one days after the administration and their disappearance a few weeks later without leaving a scar. The local reactions of BCG in adults with or without tuberculosis were studied. Generally speaking, the local reaction to BCG was found parallel to the tuberculin reaction, but much more intense than the latter. In particular, BCG provokes frequently suppuration which is not observed in tuberculin reactions. The local reaction to BCG in tuberculous patients appears early. A papule develops on the first or second day after administration. The reaction is at its maximum on the fifth day consisting in vesiculation and suppuration; scar formation occurs at the end of the third week. In a second series of patients in the terminal stage of tuberculosis with negative or slightly positive tuberculin reactions, BCG did not produce any local reactions in most cases.—*Réactions locales produites par le BCG inoculé par scarification chez les malades tuberculeux, L. Corre, Ann. Inst. Pasteur, May–June, 1946, 72: 441.*—(*V. Leites*)

History of Penicillin.—It is pointed out that an Italian, B. Gosio, isolated an antibiotic substance from some species of penicillium in 1896, that Lieske in Germany rediscovered such a substance in 1921 and that Gratia and Dath, in Belgium, reported a similar substance in 1924. The Belgian authors treated patients with furunculosis with such a substance as early as 1927 and stated that "It is the most effective treatment, even of the most resistent types of stapholococcic diseases."—*The First Discoverers of Penicillin and of Its Application in Therapy, J. T. Peters, Acta med. Scandinav., 1946, 126: 60.*—(*M. Pinner*)

Bacteriostasis *in vitro*.—Twenty-nine different compounds were examined *in vitro* for their tuberculostatic activity. The drugs were mixed in various concentrations with a slightly modified Dorset medium, and the media were inoculated with a standardized quantity of a highly virulent strain of human tubercle bacilli (AT); after twenty-eight days of cultivation the known weight of the bacillary growth was compared with the known weight of the seeded bacilli. P-aminobenzoic acid, an essential metabolite of the tubercle bacillus, destroys the bacteriostatic action of sulfanilamides; it had no influence on the normal growth of the tubercle bacilli in the concentrations employed in these experiments. Of all the substances studied, sulfathiazole had the greatest tuberculostatic action. A new derivative of sulfapyridine abolished the bacteriostatic action of this drug. Sulfanaphthoquinone has a pronounced tuberculostatic effect. It was used because a naphthoquinone has been obtained from the tubercle bacillus and is essential for the growth of another acid-fast bacillus. Two other naphthoquinone compounds were ineffective. 4,4′-diaminophenylsulfone was highly active. Its derivatives, diasone and tibatin, were less effective, and then only in so far as they were converted into the parent substance. Good results were obtained with a hydroxythiazolyle sulfone, a derivative of promizole. Promizole itself had no definitive effect, and a few other of its derivatives were only moderately active. 4-amino-methylsulfanilamide, the bacteriostatic action of which is not inhibited by P-aminobenzoic acid, was active in high concentrations. On account of the affinity of several vital stains for the tubercle bacillus a number of triphenylmethyl-substituted sulfanilamides were synthesized but showed no activity in the concentrations obtainable. Iodinin has a strong inhibitory effect on streptococci, which can be eliminated by certain quinones. In the high dilutions that could be obtained it had a definite effect on tubercle bacilli. A quinoxaline-di-N-oxide had a moderate action. Urea and thiourea were ineffective, while thiouracil was slightly active. Sulfanylacetophenone was somewhat tuberculostatic; sulfanylacetone was inactive.—*Tuberculostatic Activity in vitro of Twenty-nine Different Compounds (Sulfanilamides, Naphthalene and Tritane Derivatives of Sulfanilamide, Diaminodiphenylsulfones, Derivatives of Promizole, Iodinin and Some Others), A. R. Frisk, Acta med. Scandinav., 1946, 125: 487.*—(*O. Pinner*)

Antagonistic Growth Substances.—Substitution of an SO_3H or SO_2NH_2 radical for the COOH in certain growth promoting compounds has been shown to produce antagonistic, or bacteriostatic, effects. Asparagine, the amide of aspartic acid, is known to favor growth of tubercle bacilli. Theoretically, then, by substituting an SO_3H (or SO_2NH_2) radical for one of the carboxyl radicals in asparagine, a bacteriostatic may be obtained. Cysteic acid (2-amino 3-sulfonic propionic acid) synthesized first by Friedmann in 1903, is the resulting compound and has been shown to inhibit growth of *S. aureus*, *B. coli* and proteus bacilli, although heretofore no work has been done with this agent in connection with the tubercle bacillus. Experimental work with cysteic acid added to Sauton's medium, with and without asparagine, demonstrated the validity of this induction: cysteic acid does vitiate the favorable effect of asparagine when used in equal molecular concentration with asparagine; when used alone, measurable bacteriostasis obtains. Cysteic acid appears to diminish bacillary proliferation

in proportion to the *log.* of its concentration. Sulfolactic acid ($COOH\text{-}CHOH\text{-}CH_2\text{-}SO_3H$), obtained from cysteic acid by the substitution of an OH for the NH_2 radical, is equally effective in inhibiting growth of tubercle bacilli.—*Influence antagoniste de l'asparagine et de l'acide cystéique sur la croissance du bacille tuberculeux humain, E. Perdigon, F. Bouquet, M. T. Mazaudier & F. Godard, Ann. Inst. Pasteur, July–August, 1946, 72: 573.*—(*P. Q. Edwards*)

Chemical Inhibition of Bacilli.—The activity conferred upon a given organic nucleus by the addition of various radicals has been the subject of the present paper. A culture of avian tubercle bacilli on Sauton's medium is not influenced by benzene, but the amine of benzene, that is, aniline, is active in 1:1,000. Aniline derivatives obtained by substitution, for example acetanilide, were found to be inactive; addition of an NO_2 group appears to enhance the inhibitory action; addition of a second NH_2 group also increases inhibitory activity considerably. Phenol is active in 1:2,000 concentration; alcoylation in certain positions increases this activity. Benzoic acids and their derivatives are, as a group, practically inactive. Benzaldehyde, active in 1:1,000, is further activated by nitration, especially in the ortho and meta positions. Naphthalene has no action *in vitro* on Koch's bacilli, yet by introduction of an amine radical in the β position considerable activity is produced. Double nitration further enhances activity. Derivatives of organic metallic compounds, such a phenylarsinic acid, show some activity; hydrazines are more active. Urea, sulfoxides, sulfones, amines, quinones, pyridines, chaulmoogra acids and divers substances are cited with relation to their inhibitory activity. Of all the above compounds, the amines, aldehydes and nitrated derivatives appear to possess the most inhibitory activity against Koch's bacillus.—*De l'activité inhibitrice des représentants de quelques séries chimiques sur la pousse du bacille de Koch, J.-P. Jouin & Buu-Hoi, Ann. Inst. Pasteur, July–August, 1946, 72: 580.*—(*P. Q. Edwards*)

Tuberculostatic Substances.—The compound 5-amino-2-butoxy pyridine and its least toxic derivative, a sodium formaldehyde bisulfite compound, proved to be bacteriostatic *in vitro* for 607, the rapidly growing strain of tubercle bacillus, as well as for virulent and recently isolated strains, but not for other species of bacteria. The bacteriostatic activity of these compounds against the tubercle bacillus was not antagonized by para-aminobenzoic acid, methionine, riboflavin, calcium pantothenate, adenine, guanine, thiamine, uracil, nicotinic acid, biotin, culture filtrates from staphylococci, pneumococci and tubercle bacilli, pus from streptococcal lymphadenitis, constituents of beef culture, media, peptone, whole blood and serum up to 25 per cent. It is suggested that the mechanism of action involves the interference with some essential metabolic process common to species of *Mycobacterium* but not to other genera of organisms.—*A New Class of Tuberculostatic Substances, W. H. Feinstone, Proc. Soc. Exper. Biol. & Med., October, 1946, 63: 153.*—(*F. B. Seibert*)

Antibiotic from *Ramalina Reticulata*.—A crystalline substance was isolated from *Ramalina reticulata*, sometimes called California Spanish moss, which is a lichen. The methods of isolation are described, as well as some of the chemical and physical characteristics of this crystalline material. *In vitro* experiments showed that this substance has antibacterial properties; in a concentration of 50 gamma per cc. of medium, it completely inhibited the growth of some pneumococci and streptococci. Human strains of tubercle bacilli were completely inhibited by concentrations of 1:50,000 and some inhibition occurred at concentrations as low as 1:2,000,000. The bovine strain, Ravenel, was inhibited by a concentration of 1:20,000. The substance could be administered to both normal and tuberculous guinea pigs without obvious toxic effects. In the few animal experiments reported, it was established that this substance inhibited experimental tuberculosis to a marked degree, as shown by weight, mortality, extent and characteristics of the tuberculous lesions in treated

animals.—*A Crystalline Antibacterial Substance from the Lichen Ramalina Reticulata, A. Marshak, Pub. Health Rep., January 3, 1947, 62: 3.—(M. Pinner)*

Streptomycin in Tuberculosis.—In the past two years 100 patients with various types of tuberculosis were treated with streptomycin. Twelve patients had generalized hematogenous tuberculosis, 9 of them with clinical evidence of meningitis. Six of these 12 patients died. Five of the surviving patients have been observed for from two to ten months; 4 of them had tuberculous meningitis. Symptomatic improvement was observed within one or two weeks after the treatment was begun. It has been impossible to demonstrate tubercle bacilli in the cerebrospinal fluid after several weeks of treatment. Changes in the spinal fluid to nearly normal occurred in 2 patients. Residual neurological disturbances are present in 3 of the 4 patients. The treatment consisted of the intrathecal administration of 100 to 200 mg. of streptomycin every twenty-four to forty-eight hours for two to six weeks. In addition, they received 2 to 3 g. of streptomycin by intramuscular injection for six months. None of the patients who died had received intrathecal therapy. Clinical, roentgenographic and histopathological evidence of healing trends were observed in miliary tuberculosis but actual cure was not witnessed. Thirty-two patients with active, usually progressive, nonsurgical tuberculosis of the lungs in which rapid, spontaneous improvement was not likely to occur were treated with streptomycin. Twenty-one patients had far advanced, 9 moderately advanced and 2 minimal disease. Definite roentgenographic improvement was observed in 25 patients. In 12 patients cavities closed, in 6 patients thick walled cavities persisted, in the rest cavities were not demonstrable. In 13 patients sputum conversion was observed, 15 patients remained positive. No progression of the pulmonary lesions was noted during the treatment. Five patients died. After the discontinuation of treatment, reactivation occurred in 6 patients, one of them developed a streptomycin-resistant strain of *Mycobacterium tuberculosis* at the time of reactivation. Five patients with ulcerating lesions of the respiratory passages showed prompt improvement following treatment with streptomycin. Tuberculous empyema treated by intramuscular or intrapleural (or both) administration of streptomycin showed improvement only in one out of 7 cases. Fifteen patients with various types of tuberculous fistulae responded favorably to streptomycin within four to six weeks. Streptomycin had only palliative value in the treatment of 15 patients with tuberculous cystitis. Four patients with tuberculosis of bones and joints responded to treatment with streptomycin. In 7 patients surgical measures in the treatment of pulmonary tuberculosis were combined with streptomycin therapy with seemingly good results. The dosage of streptomycin was 1 to 3 g. per twenty-four hours divided in 4 to 6 doses. The solution consisted of 100 to 250 mg. of streptomycin in 1.0 cc. of sterile water. Aerosol spray consisted of 20 cc. of isotonic solution of sodium chloride which contained 0.5 g. of streptomycin; 2 cc. were nebulized each hour for ten hours of the day. The most frequent reaction caused by streptomycin was disturbance of equilibrium. In many instances streptomycin appeared to suppress tuberculosis rather than to eradicate it. It is not to be regarded as a substitute for other and proved effective forms of treatment of tuberculosis.—*Treatment of Tuberculosis with Streptomycin: A Summary of Observations on One Hundred Cases, H. C. Hinshaw, W. H. Feldman & K. H. Pfuetze, J. A. M. A., November 30, 1946, 132: 778.—(H. Abeles)*